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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 3] [1919

III.—CONTRIBUTIONS TO THE FLORA OF MACEDONIA: II.

W. B. Turrill.

A small parcel of plants collected by Sergt. J. M. Russell in the Paprat District, Krusa Balkan, Central Greek Macedonia, arrived too late for inclusion in the first paper of this series (*Kew Bulletin*, 1918, p. 249), and is dealt with here. The list given below is chiefly of interest in adding considerably to the number of plants recorded in flower in July and August. As previously explained (l.c., p. 259), the vegetation in mid-summer "becomes scorched to a straw or pale-brown colour, and with few exceptions other than xerophytic plants, green vegetation and flowering specimens are limited to specially protected localities such as nullahs." Most of the specimens recorded in this paper are remnants of the earlier summer flora. The Paprat District abounds in shady and shrubby ravines, and though on a southern slope may be considered a favourable locality for summer flowers, at least, when compared with the dry hill-slopes immediately to the north of Salonika or the exposed plains of the larger rivers.

The collection is divided into two parts. The first consists of specimens collected during the last week in July and the first week in August, 1918. The second contains the plants found in the last week in August, 1918. Unless otherwise stated the specimens were collected in the flowering state. Species recorded in the previous paper are in *italics*, those recorded for the first time in this series are in clarendon type.

Plants Collected During the Last Week in July and the First Week in August, 1918.

Thalictrum angustifolium, Jacq. *Russell* 123.
Nigella arvensis, L. *Russell* 118.
Viola Kitaibeliana, R. et S. *Russell* 117.
Silene trinervia, Seb. et Maur. *Russell* 108.
Saponaria officinalis, L. *Russell* 106.

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Malachium aquaticum, *Fr.*
Russell 115.
Distr. Eur., Orient, Temp. Asia, India.
Balkans: Greece, Maced., Serb., Bulg.

Cytisus austriacus, L. *Russell* 104a.
Ononis antiquorum, L. *Russell* 107.
Medicago falcata, L. *Russell* 102, 130.

Lotus decumbens, *Poir.*
Russell 104.
Distr. S. Eur.
Balkans: Greece.

Epilobium parviflorum, Schreb. In flower and fruit, *Russell* 112.

Herniaria hirsuta, *L.*
In flower and fruit, *Russell* 128.
Distr. Cent. and S. Eur., Orient.
Balkans: General.

Scleranthus perennis, L. In flower and fruit, *Russell* 96.

Torilis infesta, *Hoffm.*
Russell 110.
Distr. Cent. and S. Eur., N. Afr., Orient.
Balkans: General.

Sambucus Ebulus, L. *Russell* 124.

Galium Aparine, *L.*
In fruit, *Russell* 100.
Distr. Eur., N. Afr., Orient, N. Asia.
Balkans: General.

Anthemis tinctoria, L. *Russell* 98.
Achillea clypeolata, Sm. *Russell* 121.
Filago arvensis, L. *Russell* 126.
Inula britannica, L. *Russell* 127.
A form with very silky leaves and aggregated capitula.
Xeranthemum annuum, L. *Russell* 113.
Centaurea salonitana, Vis. *Russell* 105.
Campanula Spruneriana, Hmpe., var. *lepidota,* Turrill. *Russell* 95.
Campanula athoa, Boiss. *Russell* 134.
Jasione Heldreichii, Boiss. et Orph. *Russell* 111, 120.

Cynoglossum nebrodense, *Guss.*
Russell 132.
Distr. S. Eur.
Balkans: Greece, Bulg.

Echium vulgare, L. *Russell* 103.
Solanum Dulcamara, L. *Russell* 116.
Linaria genistaefolia, Mill. *Russell* 131.
Veronica Velenovskyi, Uechtr. In flower and fruit, *Russell* 114.

A species related to *V. Anagallis* and *V. Beccabunga* but characterised by the slender pedicels, which are 3 to 5 times as long as the subtending bracts, the narrower, linear-lanceolate calyx segments, and the small seeds.

Teucrium Chamaedrys, L. *Russell* 122.

Salvia verticillata, *L.*
Russell 97.
Distr. Cent. and S. Sur., Orient.
Balkans: General.

Stachys angustifolia, M.B. *Russell* 133.
Origanum vulgare, L. *Russell* 125.
Rumex multifidus, L. *Russell* 129.

Juncus effusus, *L.* var. **compactus**, *Lej. et Court.*
Russell 99.
Distr. Most temperate countries.
Balkans: General.

Poa compressa, *L.*
Russell 101.
Distr. W., Cent. and S. Eur., N. Asia, N. Amer.
Balkans: Thessaly, Serb., Bulg.

Collected During the Last Week in August, 1918.

Hypericum perforatum, L. *Russell* 150.
Ononis antiquorum, L. *Russell* 144.
Dorycnium intermedium, Ledeb. *Russell* 141.
Scabiosa ucranica, L. *Russell* 151.
Anthemis tinctoria, L. *Russell* 140.
Achillea crithmifolia, W. K. *Russell* 139.
Inula britannica, L. *Russell* 149.

Carlina vulgaris, L.
Russell 143.
Distr. Eur., Orient.
Balkans: General.

Xeranthemum annuum, L. *Russell* 138.
Centaurea sublanata, Boiss. *Russell* 135.
Campanula athoa, Boiss. *Russell* 136.
A form with calyx segments and receptacles much less strigose, with fewer stiffer hairs than in *Russell* 134, and the typical plant. The plants quoted by Velenovsky (Flora Bulgarica, p. 368), under the name *C. Trachelium*, L., var. *orientalis*, Boiss., belong to this species, and Bulgaria must be added to the distribution given for *C. athoa*, Boiss., in *Kew Bulletin*, 1918, p. 306.

Verbascum banaticum, *Rosc. ap. Schrad.*
Russell 142.
Distr. Hungary, Epirus, Thessaly, Maced., Serb., Dobrudgea, Bulg.

Salvia verticillata, *L.*
Russell 145.
Distr. Cent. and S. Eur., Orient.
Balkans: General.
A form with the leaves white tomentose on the lower surfaces.

Calamintha vulgare, *L.* forma **glabratum,** *Vandas,* Reliq. Formanek., p. 478.
Russell 137.
Distr. (of form) Maced.

Origanum vulgare, L. *Russell* 148.
Thymus Chaubardii, Boiss. et Heldr. *Russell* 146.

Agrostis stolonifera, *L.* (*A. alba,* Auct.).
In fruit, *Russell* 147.
Distr. Eur., Temp. Asia, N. Afr., N. Amer.
Balkans: General.

IV.—FLORA OF ALDABRA: WITH NOTES ON THE FLORA OF THE NEIGHBOURING ISLANDS.

W. Botting Hemsley and others.

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Introduction.

Description of the Atoll.

Aldabra, or Aldabra Group as it is sometimes designated, is an atoll in the Indian Ocean, situated, according to the authorities, 220 miles north-west of Madagascar, in latitude 9° 25′ south. The ring of land surrounding the lagoon is about

twenty-two miles long by eight miles in its greatest breadth, oblong-oval in outline, and with its longer axis lying east and west. The land-rim is broken up into four islands of odd shapes, very unequal in size, the main island surrounding at least two-thirds of the lagoon. Within the lagoon there are several islands of relatively large area and hundreds of small islets varying in size from a few acres to a few square yards. The inner or lagoon shore of the land-rim is everywhere bounded by mangrove swamps, intersected by numerous channels. In length the lagoon is about twenty miles with a width of six miles, and it is connected with the open sea by four channels, the largest of which is four hundred yards wide and eight to ten fathoms deep, and the only one deep enough to allow of the passage of a large vessel. Mr. J. C. F. Fryer describes in some detail the topography, physical features, etc., of Aldabra, and it will be sufficient for the purposes of this paper to give a short extract from his work concerning the islands which he designates the Aldabra series. "It contains the islands of Aldabra, Assumption, Cosmoledo, Astove, Farquhar, Providence and St. Pierre. The whole series lies to the north of Madagascar, between longitudes 45° E. and 52° E., and between latitudes 9° S. and 10·5° S., the component islands being separated from 20 miles—Aldabra and Assumption—to 180 miles —Astove and Farquhar."

For purposes of comparison I have also summarised very briefly what is known to me of the botany of Gloriosa, the Amirantes group, Coëtivy, Agalega, Cargados, the Laccadives, Maldives, and the Chagos Archipelago.

Climate.

There are few statistics of the meteorology of Aldabra, but there are sufficient data to establish the fact that its climate is one of extremes of drought and rainfall. Writers differ widely in their estimate of its qualities. Professor Stanley Gardiner, writing of Mr. Fryer's stay in the island (September to the end of January), says: "His work during this, the summer season at Aldabra, must have been, as we know by our own experience elsewhere, arduous in the extreme on an island of jagged coral, covered with the hard-wooded *Pemphis acidula*, through which all paths had to be cut, and having in the centre a stinking mangrove swamp literally alive with mosquitoes. Even native labour dislikes going to Aldabra, which has an evil reputation second to none in the world."

Voeltzkow, as quoted by Schinz, says: "Aldabra lies within the range of the trade winds and has an agreeable climate, as the cool sea winds temper the great heat. The average temperature at mid-day, from the middle of April to the middle of May, is 85° to 86° Fahr. with a nightly fall of about 10°. The rainy season begins in December, but showers are frequent even in May. The dry season begins towards the month of July."

Mr. Dupont records a series of observations of temperature and rainfall from October to January. He states that the climate of Aldabra is much warmer than that of Mahé, and

gives figures for the months named in support of this statement. Daily readings at 9 a.m. recorded an approximate average of 89·8° for Aldabra, against 82·4° for Mahé. The rainfall for the same period was respectively about 34 in. and 49 in. Dupont adds: "The dry season of Aldabra occupies seven months of the year, and the absence of rain is the cause of much trouble to the inhabitants who neglect to store sufficient to provide against the drought. There is only one well in the island, 16 miles distant from the settlement, and the water has to be fetched by boat." The heaviest rainfall in both islands was in January, when upwards of 25 in. fell in 17 days in Aldabra and 21 in Mahé.

The Flowering Season.

Concerning the flowering season in Aldabra, Mr. Dupont wrote: "An old resident told me that in January to May the whole island is a mass of flowering shrubs and herbaceous plants, and that nowhere in Seychelles such a display of wild flowers with its accompaniment of insects and birds is to be seen."

History of the Botanical Investigation of Aldabra.

The history of the botanical exploration of Aldabra begins, so far as this compilation is concerned, with Dr. W. L. Abbott's Notes on the Natural History of the Atoll in the *Kew Bulletin* for 1893, in which he specially mentions thickets of *Casuarina*, and mangroves 50 to 60 ft. high. Further particulars by the same author appeared elsewhere and Mr. Dupont repeats them in his report, published in 1907. From this source I have extracted much that is of interest in connection with the vegetation of Aldabra and other islands. Abbott's notes were followed in 1894 by Mr. J. G. Baker's report on Abbott's botanical collection. This collection comprised fifty-two species of flowering plants, including nine new ones. Noteworthy among the older forms was *Lomatophyllum borbonicum*, a liliaceous genus of two or three species restricted to the Mascarenes and the smaller islands of the western Indian Ocean, though hitherto not recorded from Seychelles.

In point of date Mr. S. C. E. Baty, a local owner or joint owner of insular property, is the next contributor, in the form of an unpublished report on the Aldabra and Cosmoledo groups of islands, a copy of which is in the Kew Library. This report is mainly on the coco-nut industry and the useful trees, with some topographical notes. He mentions, too, that Aldabra was covered with stunted forest from end to end; that some 350 coco-nut trees had been planted, and that Coco-nut Islands at the east end of the lagoon had a small grove of coco-nut trees and some fine Casuarinas.

During the years 1889 to 1895, Dr. A. Voeltzkow, a professor of zoology, travelled in Africa and Madagascar and likewise visited Aldabra, where he made a small herbarium. This was classified and the results published in 1897 by Dr. Hans Schinz, who also incorporated Abbott's plants in his enumeration. A few pages of introduction treat of the topography and local conditions,

supplied by Voeltzkow, and of the composition of the vegetation, by the author. The number of species of flowering plants was hereby increased from fifty-two to seventy-one, inclusive of one new species, *Grewia salicifolia*. I have not seen Voeltzkow's book, but a notice of it by Hahn in Peterman's Geographische Mitteilungen for 1898 conveys a false idea of the vegetation of Aldabra which is said to consist chiefly of *Rubiaceae*, *Tiliaceae*, *Leguminosae*, and especially of *Oleaceae*. *Rubiaceae* and *Leguminosae* are certainly dominating families; but the *Tiliaceae* are represented by the genus *Grewia* only, and *Jasminum aldabarense* is the sole member of the *Oleaceae* known to inhabit the island.

Mr. Dupont's help in the investigation of the Flora of Seychelles, Aldabra, and other coral islands of the western Indian Ocean, has been most valuable and continuous, beginning in 1905 and ending, so far, in 1916. His technical knowledge of plants enabled him to answer botanical questions, to which he always very promptly responded. His first communication concerning Aldabra plants is dated Dec. 7th, 1906, and included a list of dried specimens of upwards of a hundred species of plants collected by himself in the atoll, together with their local names, applications, etc. This was followed in 1907 by a most interesting and valuable report to the Governor of Seychelles. It is a mine of information, general and special, and is illustrated by charts of all the groups, except St. Pierre, and by a tabulated view of the distribution of the plants in the islands and in Madagascar and the Mascarenes. The section relating to Aldabra is much fuller than the others, especially on the vegetation, and, as the report exists in few libraries, some of the paragraphs are reproduced here in detail. Mangroves constitute the bulk and a predominating feature in the vegetation, and Dupont records particulars of the extent, composition and economic value of this element in the "forests," as he terms them. In his own words: "the lagoon is encircled on all sides by mangrove trees, which are visible from outside on spots where the ring of land is narrow. Most of the islets in the lagoon are also covered with the same trees. The contrast between them and the scrubby ring of land is striking. As the ring of land is about thirty-nine miles long, the dimensions of the forest may be put down as 3000 acres. The forest is not of uniform width, some places being destitute of trees and others possessing forests which extend alongside channels as far as one mile inland. On Ile Picard and Middle Island I have come across lofty trees over 60 ft. high and over 1 ft. in diameter. Towards the south very fine clumps are also to be seen, but the forest in this part is not in a very healthy condition."

He enumerates eight species of mangrove under their botanical and popular names, and groups them in two sets, as follows:—

I. Mangroves constituting the bulk of the forests.
Rhizophora mucronata—Manglier Hauban. *Rhizophoraceae*.
Bruguiera gymnorhiza—Grand Manglier Rouge. ,,
Ceriops Candolleana—Manglier Jaune. ,,

Avicennia marina—Manglier Blanc. *Verbenaceae.*

II. Mangroves which exist in isolated patches only, except on Ile Esprit, where seven out of the eight species grow within fifty yards.

Carapa moluccensis—Manglier Pomme. *Meliaceae.*

,, *obovata*—Petit Manglier Pomme. ,,

Lumnitzera racemosa—Manglier Petites Feuilles. *Combretaceae.*

Sonneratia acida—Manglier Fleurs. *Lythraceae.*

The essence of Dupont's further remarks on the distribution of the mangroves is embodied in the following abridgment:

Lumnitzera was seen only at the south* end far inland, forming separate bushy groves. *Avicennia* occupies a large area on the same part to the exclusion of all the other mangroves. The three *Rhizophoraceae* are constantly mixed together; *Bruguiera* largely predominating almost everywhere, except in Picard Island, where *Rhizophora* is very abundant, and at the south-east and south corners, where *Ceriops* is much more abundant than elsewhere. The inter-distribution of these *Rhizophoraceae* warrants the idea of a struggle for life, in which *Bruguiera* and *Ceriops* are stronger by means of their buttresses and underground roots. For the same reason *Avicennia* is stronger than the *Rhizophoraceae*, the latter requiring situations unexposed to the tide. In Middle Island the trees of *Rhizophora* are not so tall as in Picard, but those of *Bruguiera*, which predominate, are splendid, and together with *Ceriops* cover extensive ground all along the lagoon, nine miles in length.

The forest of South Island covers an area of not less than 1300 acres, but the proportion of *Rhizophora* is only about 4 per cent.; the trees existing in isolated, though sometimes very tall and healthy, patches on the western side. In this eastern portion *Bruguiera* predominates in some places, *Ceriops* in others.

Dupont's Distribution Table of the Plants of Aldabra comprises about 100 species, and it shows their occurrence in Seychelles, Amirantes, Providence, St. Pierre, Astove. Cosmoledo, Assumption, Comoros, Gloriosa, Madagascar and the Mascarenes, so far as known to the author. It is not nearly so complete or correct as it might have been, because he could not delay the publication of his report until the names of those plants unknown to him could reach him from Kew. A considerable number of these plants were previously unknown at Kew, and are apparently endemic in Aldabra, though likely to occur in some of the other islands or in Madagascar.

From this table and other sources of information it is evident that the Flora of Aldabra differs from that of the other atolls or small islands named above of what may be termed the Seychelles area. It differs in being much richer in genera and species and in having a considerable endemic element, or at least an element

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* This should read east end according to Dupont's chart, on which "White Mangrove" is indicated.—W. B. H.

apparently almost wholly absent from the other islands so far as investigations have hitherto been carried.

Mr. Fryer's report on Aldabra and neighbouring islands is a comprehensive one, dealing most fully with Aldabra, and containing many paragraphs of interest to the botanist, which are freely repeated here. It contains a chart of the atoll, and the illustrations of scenery give a good idea of its physical features and natural aspects. Fryer arrived at Aldabra on the 13th of September, 1908, and remained there until the 24th of January, 1909, so that he had opportunities for studying the fall and spring of vegetation. Concerning the name of the island, Fryer quotes Voeltzkow, that it is probably of Arabic origin, that it has undergone several modifications, and signifies "The Green," in reference to the dense vegetation. Passing to the section treating of the vegetation, it should be explained that the main topographical features of the atoll are: the land; the lagoon, comprising the lagoon shores—mangrove swamps—and channels to the sea; and the fringing reef and outer slope. In the author's own words: "The floral seasons actually coincide with the climatic. The season of south-east trades is generally a season of drought and rest, and many of the trees being leafless, all forms of bush have then an extremely barren and dead appearance. At the end of October signs of renewed life are visible, and after the first rains in November many plants begin to flower, often before their leaves have appeared. In December and January the remainder of the plants are in flower, with the exception of a few, which by their condition suggest that they flowered quite at the end of the season. There are roughly four types of vegetation corresponding to four different classes of situation. These are: 1. Mangrove Swamp; 2. Pemphis Bush; 3. Varied or Open Bush; and 4. Shore Zone.

The mangrove swamp fringes the lagoon, but is also found on the seaward coast of the atoll at Camp Frigate and on Magnan Island in the western channel, where it is protected from the direct force of the waves. It is composed of true mangroves—*Rhizophoraceae*; the genera being *Rhizophora*, *Bruguiera* and *Ceriops*. *Rhizophora mucronata* is uniformly scattered through almost every part of the swamp, and also forms forests in one or two places, notably Picard and Camp Frigate, which contain few trees of other species. The genus *Bruguiera* is represented by two species, *B. gymnorhiza*, and another not yet determined,* which together form a large proportion of the forest along Malabar and Main Islands and especially to the south of Michel Island. It is the largest tree on Aldabra and reaches a height of 60-70 ft. Of the genus *Ceriops* there are apparently three species, *C. Candolleana* and two others. On Aldabra it is an uncommon genus and is most prevalent at Lance Cavallier,

* Mr. Fryer hoped to be able to publish the grounds on which he formed the opinion that he had to do with two species of *Bruguiera* and three of *Ceriops*. Other writers have expressed similar convictions, and there may be differential characters which are not evident in dried and spirit-preserved specimens. At all events, I recognised only one species of *Bruguiera* and one of *Ceriops* in the material collected by Fryer, and now I am unable to re-examine it.—W. B. H.

south of Esprit Island, on Esprit itself and on the Main Island north-east of Michel. Both *Bruguiera* and *Ceriops* do not require much mud and are tolerant of a rocky situation, and one which the tide reaches but for a short period.

Of other mangrove swamp trees there are five genera, the most prevalent being *Avicennia marina*, which is found all round the lagoon between tide-marks, especially in sandy places. It also forms a large forest in the extreme east of the atoll, where the trees attain a large size. *Sonneratia acida* is decidedly scarce and occurs only on Esprit and Picard Islands. *Carapa obovata* and *C. moluccensis* are both found on Esprit Island, and the latter on Picard and on one of the islands in the western channels. At Esprit a small forest is formed by *C. moluccensis* between the ridge of rock previously described and the true mangrove swamp.

2. The Pemphis Bush is composed almost entirely of *Pemphis acidula*, and is found in conjunction with the metamorphosed limestone.

3. Open Bush occurs in the neighbourhood of Takamaka, and extends round the atoll, eastward as far as a line drawn from Michel Island to Hodoul Point. To the westward it extends nearly to Dunes Jean Louis; but in this direction it is much reduced in size by the shore-zone passing far inland. Plain Cabris on Picard Island also supports the same type of vegetation. The vegetation consists mostly of low trees and bushes. Herbaceous plants are scarce, and are only found in the wet season, when a few sedges and grasses occur in places. The bushes and trees are usually leafless, or partially so, in the dry season, and flower at the commencement of the rains, often before the leaves appear. Almost all the Aldabra plants are to be found in this type of country. A few that are easily recognised are: *Euphorbia Abbottii*, various species of *Ficus*, two species of *Grewia*, and several *Leguminosae*. Large clumps of *Pandanus Vandermeeschii* are very frequent, but the majority of plants were not identified in the field.

4. The Shore Zone extends all round the atoll, varying much in width. It owes its existence to a little soil formed of sand blown up from the reef, and is naturally therefore widest on the south-east coast. Characteristic plants are *Scaevola Koenigii*, *Tournefortia argentea*, and in places *Cordia subcordata*."

Mr. Walter Fox, late Superintendent of the Botanic Garden at Penang, visited Seychelles, Aldabra, and Assumption in 1916, and made a considerable collection of dried plants, which he presented to Kew. This collection, named by the Kew Staff, contained a number of plants not previously reported from the islands, and these have been incorporated in this paper, and the collector's name appended in each case.

My thanks are due to the Council of the Linnean Society for presentation copies of Professor Stanley Gardiner's narrative of the history, equipment, and work of the Expedition. I am also greatly indebted to Sir David Prain and the Herbarium

Staff at Kew for active assistance in carrying on and completing this work after I had left the neighbourhood of Kew. Almost every member of the Staff has helped me in some way, and Dr. Stapf and Messrs. W. B. Turrill, C. H. Wright, and J. Hutchinson worked out certain families to which their names are appended, while Mr. S. A. Skan has been most kind in answering chiefly literary queries. For their valuable support I have much pleasure in recording my gratitude.

Some explanation of the late appearance of this small contribution to phytogeography is due to Professor Stanley Gardiner and other members of the Expedition, and to Mr. Dupont and the Hon. H. P. Thomasset, all of whom have worked most assiduously in collecting materials for the work. The explanation of the delay, which I greatly regret, is that a combination of circumstances—other work of a more imperative character, less working capacity, and duty calls on my time—has prevented me from pursuing a labour of love.

The projected Flora of Seychelles, although well advanced, must perforce still remain in abeyance. All of the leading novelties from this archipelago have been published; partly in the *Kew Bulletin* and Hooker's Icones Plantarum; partly in the Journal of Botany. Many almost extinct plants and other imperfectly known plants have thus been placed on permanent record.

Systematic Enumeration of the Vascular Plants of Aldabra.

Under each species reference is given to Baker's Flora of Mauritius and Seychelles, when the species is contained in that work. For additional previously described species reference is given to a regional publication, such as the Flora of Tropical Africa, and for new species to the place of publication. Descriptions of most of the novelties have appeared in the Journal of Botany, 1916, Supplement ii., and 1917, pp. 285-288. Synonyms are cited only in cases where it seemed desirable for clearness. Some of the species admitted in this enumeration might with equal reasons perhaps have been included in the category of those owing their presence in Aldabra to the direct or indirect influence of man; but such species are left out of consideration in the discussion of the indigenous element.

Menispermaceae.

Cissampelos Pareira, *L.*, var. **nephrophylla,** *Diels* in Engl. Pflanzenr., Menispermac., p. 292.

Fox 263.

Distr. The species generally dispersed in hot countries.

Capparidaceae.

Cleome strigosa, *Oliv.* Fl. Trop. Afr. i. p. 80; Baker in *Kew Bull.*, 1894, p. 146. *Polanisia strigosa*, Boj.; Schinz in Abhandl. Senckenb. xx. p. 84.

Abbott; *Thomasset* 236; *Fryer* 43.

Distr. East Africa. Also Astove, *Fryer* 10; Gloriosa (*Baker*).

Gynandropsis pentaphylla, *DC.*; Baker, Flora, p. 9.
Dupont 42.
Distr. Widely spread in warm countries, largely as a weed of cultivation.

Maerua Dupontii, *Hemsl.* in Journ. Bot. 1916, Suppl. ii. p. 2.
Fryer 64; *Dupont* 136, 137.
Distr. Endemic.

Maerua, cfr. **M. cylindrocarpa,** *Gilg & Bendict* in Engl. Jahrb., liii. p. 241.
Fox 270.

Maerua, cfr. **M. pubescens,** *Gily* in Engl. Jahrb., xxxiii. p. 223.
Fox 260.

Capparis galeata, *Fresen.*; Oliv. Fl. Trop. Afr. i. p. 95; Baker in *Kew Bull.*, 1894, p. 146.
Abbott; *Dupont* 5, 21; *Fryer* 20.
Distr. Tropical Africa and Asia. Astove, *Fryer* 5.

Bixaceae.

Flacourtia Ramontchii, *L'Herit.*; Baker, Flora, p. 12.
Dupont 57, 94; *Fryer* 35; *Fox* 244.
Distr. Common in the tropics of the Old World; often planted.

Portulacaceae.

Portulaca quadrifida, *L.*; Baker, Flora, p. 125; *Kew Bull.*, 1894, p. 147.
Abbott, *Fox* 216; *Dupont* 60; *Fryer* 104; *Thomasset* 214.
Distr. Widely spread in the tropics, especially in maritime districts. Assumption, Astove, *Thomasset*.

Guttiferae.

Calophyllum Inophyllum, *L.*; Baker, Flora, p. 16.
Dupont 128; *Fryer* 55.
Distr. A common sea-shore tree in Asia and Polynesia.

Malvaceae.

Sida spinosa, *L.*; Baker, Flora, p. 20; Schinz in Abhandl. Senckenb. xii. p. 87.
Fox 264; *Fryer* 107; *Dupont* 119; *Thomasset* 238.
Distr. Very widely spread in the tropics.

Sida carpiniifolia, *L. f.*; Baker, Flora, p. 20.
Fox 286.
Distr. General in the tropics.

Abutilon asiaticum, *G. Don*; Baker, Flora, p. 21.
Dupont.
Distr. Tropics of both hemispheres; often naturalised.

Abutilon sp., an **A. angulosum,** *Bojer*, in Herb. Kew ?; Hemsl. in Journ. Bot. 1916, Suppl. ii. p. 4 (description). *Abutilon indicum*, Baker in *Kew Bull.*, 1894, p. 147, non L.
Abbott; *Dupont* 58; *Thomasset* 226.
Thomasset's specimens are labelled Astove, Cosmoledo and Aldabra.

Thespesia populnea, *Corr.*; Baker, Flora, p. 25.
Fryer 83.
Distr. Widely spread in maritime districts in the tropics of the Old World and general in Polynesia from Easter Island westward.

Tiliaceae.

Grewia aldabrensis, *Baker* in *Kew Bull.*, 1894, p. 147.
Abbott; *Dupont* 54; *Fox* 208; *Fryer* 58, 73; *Thomasset* 258.
Distr. Endemic.

Grewia salicifolia, *Schinz* in Abhandl. Senckenb. xxi. p. 87.
Fox 235; *Fryer* 88; *Voeltzkow*.
Distr. Endemic.

Erythroxylaceae.

Erythroxylon acranthum, *Hemsl.* in Journ. Bot., 1916, Suppl. II. p. 5.
Dupont 103; *Fox* 273; *Fryer* 35, 87; *Thomasset* 233.
Distr. Endemic.

Zygophyllaceae.

Tribulus cistoides, *L.;* Oliv. Fl. Trop. Afr., i. p. 284 (under *T. terrestris*); Schinz in Abhandl. Senckenb. xx. p. 85.
Voeltzkow.
Distr. Tropics generally, especially in maritime districts.

Tribulus terrestris, *L.;* Baker, Flora, p. 36; *Kew Bull.*, 1894, p. 147.
Abbott; *Dupont* 104; *Fryer* 102.
Distr. Very widely spread in the tropics.

Simarubaceae.

Suriana maritima, *L.;* Baker, Flora, p. 42; *Kew Bull.*, 1894, p. 147.
Abbott; *Dupont* 3; *Fox* 214.
Distr. One of the commonest seaside shrubs in the tropics of both hemispheres.

Meliaceae,

Carapa moluccensis, *Lam.;* Hemsl. in Journ. Bot. 1916, suppl. II. p. 7; Dupont Report, t. 24, non Baker, Flora, p. 46, in nota. *Trichilia* (?) Baker, Flora, p. 47, in nota.
Dupont; *Fryer*.
Distr. Tropical shores of East Africa, Asia, and Australia.

Carapa obovata, *Blume;* Hemsl. in Journ. Bot. 1916, Suppl. II, p. 7; Dupont Report, 1907, p. 24. *C. moluccensis,* Baker, Flora, p. 47, in nota, non Lam.
Dupont; Fryer 72.
Distr. Malaya.

Ochnaceae.

Ochna Fryeri, *Hemsl.* in Journ, Bot., 1916, Suppl. II. p. 7. *O. ciliata,* Baker in *Kew Bull.,* 1894, p. 147, vix Lam.
Abbott; *Dupont* 1; *Fryer* 32.
Distr. Endemic.

Ochna mauritiana, *Lam.*; Baker, Flora, p. 43.
Dupont 5.
Distr. Mauritius.

Icacinaceae.

Apodytes mauritiana, *Planch.*; Baker, Flora, p. 48; Hemsl. in Journ. Bot. 1916, Suppl. II. p. 8 (descriptio amplificata).
Fox 280; *Fryer* 62; *Thomasset* 225.
Distr. Mauritius.

Celastraceae.

Celastrus senegalensis, *Lam.;* sensu Oliv. Flora Trop. Afr. i. p. 361; Hemsl. in Journ. Bot. 1916, Suppl. II. p. 8, ubi vide formas 3 descriptas. *Gymnosporia senegalensis,* Loes., var. *inermis,* Loes., forma *β chartacea,* Loes.
Dupont 19, 41, 49, 95, 101; *Fryer* 11, 57; *Thomasset* 234, 245, 246, 256; *Fox* 209; *Voeltzkow* 18.
Distr. Widely spread in Africa, both tropical and extra-tropical, and the Mediterranean region, eastward to India.

Elaeodendron sp.
Fox 212.
Distr. Elaeodendron is a considerable genus, common in the tropics of both hemispheres, including Mauritius.

Rhamnaceae.

Scutia Commersonii, *Brong.;* Baker, Flora, p. 51; *Kew Bull.,* 1894, p. 147.
Dupont 6, 37, 139; *Fox* 213; *Fryer* 40; *Thomasset* 232.
Distr. South Africa; Mascarene Islands; tropical Asia.

Colubrina asiatica, *L.;* Baker, Flora, p. 52; Hemsl. in Oliv. Flora Trop. Africa, i. p. 383.
Fryer 34, 90.
Distr. East Africa; Mascarene Islands; Tropical Asia, Australia, and Polynesia.

Gouania Retinaria, *DC.;* Balf. fil., Fl. Rodriguez, Reprint p. 34; Hemsl. in Journ. Bot. 1916, Suppl. II. p. 10. *G. tiliaefolia,* Baker, Flora, p. 52, pro parte.
Dupont 12, 129; *Fryer* 76; *Thomasset* 231.
Distr. Mascarene Islands.

Gouania tiliaefolia, *Lam.*; Baker, Flora, p. 52, pro parte; Balf. fil., Fl. Rodriguez, Reprint, p. 34; Schinz in Abhandl. Senckenb. xxi. p. 86; Hemsl. in Journ. Bot. 1916, Suppl. II. p. 10.
Abbott; *Voeltzkow.*
Distr. Mascarene Islands.
There is a little doubt about this being the genuine *G. tiliaefolia* of Lamark.

Sapindaceae.

Allophylus racemosus, *Radlk. Schmidelia racemosa*, L.; Baker, Flora, p. 56.
Fox 271.
Distr. Madagascar, Seychelles, Mascarenes and Tropical Asia.

Allophylus africanus, *Palisot;* Baker in *Kew Bull.*, 1894, p. 147 (sub *Schmidelia*). *Schmidelia africana*, DC.; Baker in Oliv. Fl. Trop. Africa, i., p. 421.
Abbott; *Fryer* 63.
Distr. Tropical Africa.

Macphersonia madagascariensis, *Blume*; Radlk. in Sitzungsb. K. Baier. Akad. 1890, p. 248. *Macphersonia pteridophylla*, Baill., Adansonia, xi. p. 240. *Albizzia fastigiata*, Mey. ? Baker in *Kew Bull.*, 1894, p. 148—Leaves only; Dupont, Report, p. 36.
Abbott; *Dupont* 28.
Distr. Madagascar. Dupont also collected it in Cosmoledo.
There are three very closely allied species of *Macphersonia*, namely, the above and *M. laevis*, and *M. Hildebrandtii*, Radlk., loc. cit., and I am not quite sure that I am right in referring the Aldabra specimens to *M. madagascariensis.*

Anacardiaceae.

Odina Woodier, *Roxb.* ? Thwaites, Enum. Ceylon Pl. p. 78.
Dupont 9. Leafless specimen in fruit.
Distr. The genus *Odina* is common to tropical Africa and Asia.

Moringaceae.

Moringa pterygosperma, *Gaertn.;* Baker, Flora, p. 9; Schinz in Abhandl. Senckenb. xxi. p. 84.
Voeltzkow, 5a, 61.
Distr. Tropical Asia and naturalised here and there in hot countries.

Leguminosae—Papilionatae.

Tephrosia aldabrensis, *J. R. Drumm. & Hemsl.* in Journ. Bot. 1916, Suppl. II. p. 11. *T. purpurea*, Baker in *Kew Bull.* 1894, p. 147, non Pers.
Abbott; *Dupont*; *Fryer* 59; *Thomasset* 230.
Distr. Endemic.

Abrus precatorius, *L.;* Baker, Flora, p. 78; *Kew Bull.* 1894, p. 147; Schinz in Abhandl. Senckenb. xxi. p. 85.
Abbott; *Fryer* 81; *Voeltzkow.*
Distr. Now very generally dispersed in tropical and some sub-tropical countries. Rare in coral islands.

Sophora tomentosa, *L.*; Baker in Oliver Fl. Trop. Afr., ii., p. 254; Hemsl. Bot. Chall. Exped. i. pt. I. p. 30; pt. III. p. 144.
Fox 262; *Thomasset* 221.
Distr. Generally diffused on tropical sea-shores and extending to some extra-tropical regions.

Leguminosae—Caesalpinioideae.

Caesalpinia Bonducella, *Fleming*; Baker, Flora, p. 88.
Thomasset 228.
Distr. Widely spread in the tropics of both hemispheres.

Caesalpina sepiaria, Roxb.; Baker, Flora, p. 88; Dupont, Report, 1907, p. 36.
Dupont.
Distr. Tropical Asia. Baker regards all the members of this genus in the Mascarene region as introduced; but it is probable that they owe their presence to the action of currents.

Cassia aldabrensis, *Hemsl.* in Journ. Bot. 1916, Suppl. II. p. 12.
Dupont 123; *Thomasset* 231, 262.
Distr. Endemic.

Cassia mimosoides, *L.;* Baker, Flora, p. 90; *Kew Bull.* 1894, p. 147; Schinz in Abhandl. Senckenb. xxi., p. 85.
Abbott; *Fox* 236; *Voeltzkow.*
Distr. Common in the tropics of both hemispheres.

Cassia occidentalis, *L.;* Baker, Flora, p. 89; *Kew Bull.* 1894, p. 147; Schinz in Abhandl. Senckenb. xxi., p. 85.
Distr. Now widely dispersed in Tropical Africa and Asia, as well as in America, though possibly of American origin.

Tamarindus indica, *L.*; Baker, Flora, p. 91; Balfour, Bot. Rodriguez, p. 37; Dupont, Report, p. 14, in map; Prain in Journ. As. Soc. Bengal, lx. p. 312.
Dupont; *Fryer* 94. Probably introduced in Aldabra.
Distr. Now common in Tropical Africa and Asia, extending to North Australia. Introduced in America. Commonly cultivated.

Leguminosae—Mimosoideae.

Pithecolobium ambiguum, *Hemsl.* in Journ. Bot. 1916, Supl. II. p. 13.
Fryer 39.
Distr. Endemic.

Gagnebina tamariscina, *DC.*; Baker, Flora, p. 91.
Fryer 117; *Dupont* 46; *Thomasset* 233.
Distr. "Very common, and also in Cosmoledo"—*Thomasset*: Mauritius and Madagascar.

Desmanthus Commersonianus, *Baill.*, Atlas Pl. Madag. t. 23; Baker in *Kew Bull.* 1894, p. 148; Schinz in Abhandl. Senckenb. xxi. p. 84; Dupont, Report, p. 36.
Abbott; *Dupont*; *Voeltzkow.*
Distr. Madagascar.
[*Brexia madagascariensis*, Thouars, a characteristic shrub in Seychelles, and also found in Madagascar and East Tropical Africa, is not recorded from Aldabra; but the *B. spinosa* of Lindley, generally regarded as a variety of *B. madagascariensis*, is reported from St. Pierre.]

Rhizophoraceae.

Rhizophora mucronata, *Lam.*; Baker, Flora, p. 109; *Kew Bull.* 1894. p. 140; Dupont, Report, 1907, pp. 23-28.
Dupont; *Fryer* 2.
Distr. East Africa, Madagascar, Tropical Asia, Australia, and western Polynesia.

Bruguiera gymnorhiza, *Lam.*; Baker, Flora p. 110; Dupont, Report, 1907, p. 24.
Dupont; *Fryer* 15, 37.
Distr. Muddy shores of the tropics of the Old World.
The commonest of the true Mangroves in Aldabra, having about a 2000 acreage, according to Dupont.

Ceriops Candolleana, *Arn.*; Baker, Flora, p. 109; Dupont, Report, 1907, pp. 23, 28; Bentham, Fl. Austral. ii. p. 494.
Fox 228; *Fryer* 36, 82.
Distr. Muddy shores of the tropics of the Old World.
Next to the commonest of the *Rhizophoraceae*, estimated to cover 625 acres, *Dupont.*

Weihea Thomassetii, *Hemsl.* in Journ. Bot. 1916, Suppl II. p. 14.
Thomasset 224.
Distr.
Also from Nossi Bé, *J. M. Hildebrandt* 3202.

Combretaceae.

Terminalia Fatraea, *DC.* Prodr. iii. p. 12; Baker in *Kew Bull.*, 1894, p. 148; Schinz in Abhandl. Senckenb. xxi. p. 88.
Abbott; *Dupont* 78, 126; *Fox* 272; *Fryer* 45; *Thomasset* 235.
Distr. Common in Madagascar.

Lumnitzera racemosa, *Willd.*; Benth. Fl. Austral. ii. p. 504; Dupont, Report. p. 24.
Fryer 67.
Distr. Shores of Tropical Asia, including Ceylon, and also in Australia.

Lythraceae.

Pemphis acidula, *Forst.*; Baker, Flora, p. 101; *Kew Bull.* 1894, p. 148; Schinz in Abhandl. Senckenb. xxi. p. 88.
Dupont 4, 200; *Fryer* 95; *Thomasset* 217.
Distr. Sea-coast of E. Africa, Tropical Asia, Australia and Polynesia.
Thomasset notes that this is also common in Assumption, Astove, and Cosmoledo. Not known from Seychelles.

Sonneratia acida, *L.f.;* Baker, Flora, p. 102; Dupont, Report, 1907, p. 24.
Dupont 13; *Fryer* 70.
Distr. East Tropical Africa, Asia, and Australia.

Aizoaceae.

Mollugo Spergula, *L.*; Baker, Flora, p. 107.
Dupont 23, 206; *Fryer* 68.
Distr. Sandy seashores, tropics of the Old World.

Sesuvium Portulacastrum, *L.*; Baker, Flora p. 108; Balfour, Bot. Rodriguez, p. 43.
Fox 222; *Dupont* 92; *Fryer* 10.
Distr. Widely diffused on tropical and subtropical sandy seashores.

Rubiaceae.

Oldenlandia corymbosa, *Baker* in *Kew Bull.*, 1894, p. 148, and Schinz in Abhandl. Senckenb. xxi. p. 91 ? non L. Hemsl. in Journ. Bot., 1916, Suppl. ii. p. 16, cum descriptione.*
Abbott. Dupont collected the same species in Assumption n. 108 and 108 bis.
Distr. Mascarenes.

Oldenlandia species nova ? Hemsl. in Journ. Bot., 1916, Suppl. ii. p. 16, cum descriptione.
Thomasset 260.

Oldenlandia species ad huc indescripta ? Hemsl. in Journ. Bot., 1916, Suppl. ii., p. 17.
Fryer 46.

Tarenna nigrescens, *Hiern.* in Oliv. Fl. Trop. Afr. iii. p. 92, non Warb. in Engler Bot. Jahrb. xiii. p. 431; Hemsl. in Journ. Bot., 1916, Suppl. ii., p. 17. *Coptosperma nigrescens,* Hook. f. in Benth. et Hook. f. Gen. Pl. ii. p. 87. *Webera seychellensis,* Baker, Flora, p. 139.
Dupont 32; *Fryer* 98.
Distr. East Tropical Africa and Seychelles.

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* I have found it impossible to name the species of *Oldenlandia* satisfactorily without carrying my studies and investigations farther than circumstances permit.—W. B. H.

Tricalysia cuneifolia, *Baker* in *Kew Bull.* 1894, p. 148; Hemsl. in Journ. Bot., 1916, Suppl. ii. p. 18 (descriptio ampliata).
Dupont 3, 132; Fryer 91.
Distr. Endemic.

Polysphaeria multiflora, *Hiern.* in Oliv. Fl. Trop. Afr. iii. p. 127.
Dupont 30, 86; *Fryer* 50; *Thomasset* 239.
Distr. East tropical Africa. Also from Assumption, *Dupont* 119.

Plectronia bibracteata, *Baker*, Flora, p. 146.
Dupont 204; *Fryer* 54, 74.
Distr. Seychelles and Mauritius.

Guettarda speciosa, *L.*; Baker, Flora, p. 143; Schinz in Adhandl. Senckenb. xxi. p. 9; Dupont, Report, 1907, p. 37.
Dupont; *Fox* 281; *Fryer* 51; *Voeltzkow.*
Distr. Widely spread on tropical shores, including Polynesia.

Pavetta trichantha, *Baker* in *Kew Bull.*, 1894, p. 148.
Abbott; *Dupont* 87; *Fryer* 86. Also in Assumption, *Dupont* 116.
Distr. Mascarenes.

Pavetta supra-axillaris, *Hemsl.* in Journ. Bot. 1916, Suppl. ii. p. 19.
Fryer, Ile Esprit, probably introduced.
Distr. Endemic.

Psychotria Pervillei, *Baker*, Flora, p. 155.
Fryer 56.
Distr. Seychelles.

Psychotria species indescripta ? (1) Hemsl. in Journ. Bot., 1916, Suppl. ii. p. 19.
Dupont 24.

Psychotria species indescripta ? (2) Hemsl. in Journ. Bot., 1916, Suppl. ii. p. 20.
Dupont 115.
A specimen, also in fruit only, in the Kew Herbarium, from Andrangaloaka, Central Madagascar, collected by G. W. Parker, is apparently the same as Dupont's n. 115.

Triainolepis Hildebrandtii, *Vatke* in Oesterr. Bot. Zeitschr. xxv. p. 230 (1875); Oliver Fl. Trop. Afr. iii. p. 219. *Psathura Fryeri*, Hemsl. in Journ. Bot., 1916, Suppl. ii. p. 20.
Dupont 31, 44, 91; *Fox* 259, 284; *Fryer* 44; *Thomasset* 240. Also in Cosmoledo, Thomasset 242, and Comoro Islands, Humboldt 47.
Distr. Zanzibar Island, North-West Madagascar.

Rutidea coriacea, *Baker,* Flora, p. 149.
Fox 279.
Distr. Mauritius, Bourbon.

Compositae.

Vernonia aldabrensis, *Hemsl.* in Journ. Bot., 1916, Suppl. ii. p. 20.
Fryer 41; *Fox* 283.
Distr. Endemic.

Psladia sp.?
Ile Miche.
Dupont 96; a shrub with yellow flowers.
A fragment bearing a few empty involucres.

Sonchus oleraceus, *L.*
Fox 215.
Distr. A cosmopolitan weed.

Launaea bellidifolia, *Cass.*; Oliver & Hiern. Fl. Trop. Afr., iii. p. 460. *Microrhynchus sarmentosus,* DC.; Baker, Flora., p. 181.
On the beach, *Dupont* 35.
Distr. Madagascar, Mascarene Islands, tropical Africa and Asia. Dupont collected this also in Assumption (112) and in Cosmoledo.

Goodeniaceae.

Scaevola Koenigii, *Vahl.*; Baker, Flora, p. 182, and in *Kew Bull.,* 1894, p. 148; Schinz in Abhandl. Senckenb. xxi. p. 91.
Dupont; *Fryer* 110.
Distr. A littoral shrub ranging widely from east Africa and Asia to Australia and Polynesia.

Plumbaginaceae.

Plumbago parvifolia, *Hemsl.* in Journ. Bot., 1916, p. 362.
Fryer 115.
Distr. Endemic.
It is possible that this may be a leafy condition of *P. aphylla,* Bojer, but it has a different aspect and the leaves are of a different shape and texture from those casually occurring on the barren stems of *P. aphylla.*

Plumbago aphylla, *Bojer*; Baker in *Kew Bull.,* 1894, p. 148; Schinz in Abhandl. Senckenb. xxi. p. 88; Dupont, Report, 1907, p. 37.
Dupont; *Thomasset* 257.
Distr. Dupont gives the following distribution of this singular plant: Astove, Cosmoledo, Assumption, Aldabra, Gloriosa. It is also abundant in Europa Island.

Sapotaceae.

Sideroxylon inerme, *L.*; Harv. Fl. Cap. iv. i. p. 438; Hemsl. in Journ. Bot., 1916, Suppl. ii. p. 23. *Myrsine cryptophlebia*, Baker in *Kew Bull.*, 1894, p. 149; ex Mez in Engler Pflanzenr. Menispermac. p. 397; Schinz in Abhandl. Senckenb. xxi. p. 88.
Abbott; *Dupont* 7, 14, 106, 133; *Fryer* 38.
Distr. South Africa.

Sideroxylon sp., near **S. inerme,** *L.*
Fox 243.

Oleaceae.

Jasminum aldabrense, *Hemsl.* in Journ. Bot., 1916, Suppl. ii. p. 21. *J. mauritianum*, Baker in *Kew Bull.*, 1894, p. 149, non Bojer.
Abbott; *Fryer* 6, 21; *Thomasset* 247.
Distr. Endemic.

Salvadoraceae.

Azima tetracantha, *Lam.*; Harv. Fl. Capensis, iv. i. p. 489; Thwaites, Enum. Ceyl. Pl. p. 191.
Dupont 8, 27, 73.
Distr. Tropical and South Africa; Madagascar; Ceylon and Deccan Peninsula.

Salvadora angustifolia, *Turrill* in *Kew Bull.*, 1918, p. 202.
Dupont 15. Also from Cosmoledo, *Fox* 289.
Distr. Mascarenes.

Asclepiadaceae.

Microstephanus cernuus, *N.E.Br.* in *Kew Bull.*, 1895, p. 249; Hook. Ic. Pl. t. 2994. *Astephanus cernuus*, *A. ovatus* et *A. arenarius*, Decne.; DC. Prodr. viii. p. 507; Hemsl. in Journ. Bot., 1916, Suppl. ii. p. 21. *Astephanus arenarius*, Decne.; Baker in *Kew Bull.*, 1894, p. 149; Dupont, Report, 1907, p. 39.
Dupont 102, 130; *Fox* 249; *Fryer* 89, 97; *Thomasset* 215, 254.
Distr. East Tropical Africa; Madagascar.

Sarcostemma viminale, *R.Br.*; Baker, Flora, p. 227; *Kew Bull.*, 1894, p. 149; Schinz in Abhandl. Senckenb. xxi. p. 89.
Abbott; *Fryer* 93; *Voeltzkow*.
Distr. Tropical and South Africa and Mascarene Islands.

Secamone Fryeri, *Hemsl.* in Journ. Bot., 1916, Suppl. ii. p. 22.
Dupont 47; *Fryer* 61; *Thomasset* 225.
Mr. Dupont also collected this in Assumption, n. 115.
Distr. Assumption.

Tylophora asthmatica, *Wight & Arnott*; Baker, Flora, p. 229; Dupont, Report, 1907, p. 39.
Dupont 8.
Distr. Tropical Asia, including the Laccadives.

Borraginaceae.

Cordia subcordata, *Lam.*; Baker, Flora, p. 200; *Kew Bull.*, 1894, p. 149.
Abbott; *Fryer* 19; *Thomasset.*
Distr. A littoral tree widely spread in the tropics of the Old World and Polynesia.

Tournefortia argentea, *Linn. f.;* Baker, Flora, p. 20; Schinz in Abhandl. Senckenb. xxi. p. 90.
Fryer; *Thomasset*; *Voeltzkow.*
Distr. Mascarene Islands, Seychelles, Ceylon, Andamans, Malaya, Australia.

Convolvulaceae.

Ipomoea biloba, *Forsk.*; Baker, Flora, p. 211 (as *I. Pescaprae*). Schinz in Abhandl. Senckenb. xxi. p. 89; Dupont, Report, 1907, p. 38.
Fryer 111.
Also collected by Mr. Fryer in Astove, and Dupont records it from nearly all the islands of the region.
Distr. Generally spread on sandy shores in the tropics and extending into some sub-tropical regions. Also penetrating far inland in some countries.

Ipomoea (Calonyction) grandiflora, *Lam.;* Baker in *Kew Bull.*, 1894, p. 149; Schinz in Abhandl. Senckenb. xxi. p. 89. *Ipomoea glaberrima*, Bojer; Baker, Flora, p. 211.
Abbott; *Fryer* 112.
Distr. East Africa, Seychelles, Mascarenes, Polynesia.

Evolvulus alsinoides, *L.*; Baker in *Kew Bull.*, 1894, p. 149; Schinz in Abhandl. Senckenb. xxi. p. 89; Dupont, Report, 1907, p. 38.
Abbott; *Dupont* 50; *Fryer* 113; *Thomasset* 237.
Distr. Almost cosmopolitan in the tropics; often as a weed of cultivation,

Solanaceae.

Solanum aldabrense, *C. H. Wright* in *Kew Bull.*, 1894, p. 149; Schinz in Abhandl. Senckenb. xxi. p. 89; Dupont, Report, 1907, p. 38.
Abbott; *Fryer* 5; *Voeltzkow.*
Dupont records this from St. Pierre, Astove, Cosmoledo.
Distr. Mascarenes.
In general appearance this very strongly resembles the Madagascar *S. erythracanthus*, Bojer, but that has broader, distinctly veined corolla-lobes.

Solanum indicum, *L.*
Fox 282.
Distr. In all tropical regions.

Solanum nodiflorum, *Jacq.*; Baker, Flora, p. 214; Schinz in Abhandl. Senckenb. xxi. p. 90.
Voeltzkow.
Distr. Now generally dispersed in the tropics in cultivated and waste places.

Solanum nigrum, *L.*; Baker, Flora, p. 214; Dupont, Report, 1907, p. 38.
Dupont.
Dupont records this from all the islands.
Distr. An almost cosmopolitan weed.

Scrophulariaceae.

Herpestis Monnieria, *H.B.K.;* Baker, Flora, p. 237; Schinz in Abhandl. Senckenb. xxi. p. 90.
Dupont 87; *Fox* 275; *Fryer* 9.
Distr. Tropics of both hemispheres.

Acanthaceae.

Asystasia gangetica, *T. Anders.*; Baker, Flora, p. 247.
Dupont 61; *Fox* 232, 239.
Distr. Tropical Africa, Seychelles, India, Malaya.

Barleria sp., specimen mancum fructigerum.
Dupont 118.
Mr. Fryer collected the same plant in Astove.

Hypoestes aldabrensis, *Baker* in *Kew Bull.*, 1894, p. 150; Schinz in Abhandl. Senckenb. xxi. p. 90.
Abbott; *Dupont* 43; *Voeltzkow.*
Dupont describes this as a common weed with lilac flowers. He also collected it in Assumption, n. 101, and Fryer collected it in Astove, n. 7.

Hypoestes serpens, *R.Br.*, Baker, Flora, p. 248.
Fox, 251; *Fryer* 42, 101. *Thomasset* 264.
Distr. Mauritius, Madagascar.

Verbenaceae.

Nesogenes Dupontii, *Hemsl.* in Journ. Linn. Soc., Bot., xli., p. 314, pl. 14.
Fox 250; *Dupont* 97; *Thomasset* 261.
Distr. Assumption, *Dupont* 106.

Nesogenes species nova? Hemsl. in Journ. Linn. Soc., Bot., xli. p. 315.
Thomasset 236.

Nesogenes euphrasioides, *A. Gray,* the type species of the genus, inhabits islands of the Low Archipelago and Ducie Island, approximately between 120° and 150° west longitude, and between 15° and 20° south latitude. Two other species of the

genus are known, namely, *N. prostrata*, Hemsl. (*Radamaea prostrata*, Benth.) Agalega Islands, and *N. procumbens*, Balf. f., Rodriguez.]

Stachytarpheta indica, *Vahl.*; Baker, Flora, p. 251.
Fryer.
Distr. Now common in the tropics of both hemispheres.

Premna serratifolia, *L.*; Baker, Flora, p. 254, including *P. integrifolia*, L.
Dupont 120; *Fox* 247; *Fryer* 7.
Distr. East Africa, Seychelles, Mascarene Islands, Asia.

Clerodendron minutiflorum, *Baker* in *Kew Bull.*, 1894, p. 150.
Abbott; *Fryer* 77; *Thomasset* 251.
Dupont's n. 105 from Assumption Island is *Clerodendron minutiflorum.*
Distr. Assumption, Cosmoledo.

Avicennia marina, *Vierh.*; *A. officinalis*, Baker, Flora, p. 257; *Kew Bull.*, 1894, p. 50, not Linn. Dupont, Report, 1907, p. 24.
Dupont; *Fryer* 22.
Distr. Common on muddy shores of the Indian Ocean.
Dupont records this form Astove and Cosmoledo.

Labiatae.

Ocimum gratissimum, *L.*
Fox 219.
Introduced.
Distr. Tropical Asia and Africa.

Nyctaginaceae.

Boerhaavia diffusa, *L.*; Baker, Flora, p. 264; *Kew Bull.*, 1894, p. 150; Heimerl. in Abhandl. Senckenb. xxi. p. 83.
Dupont 9, 205.
Also Astove, Fryer 9.
Distr. Tropics of both hemispheres.

Boerhaavia repens, *L.*
Dupont 6, 122; *Fox* 278, 234; *Thomasset* 244.
Distr. Tropics.

Boerhaavia elegans, *Choisy.*
Fryer 80; *Thomasset* 235.
Distr. Tropical Africa and Asia.

Pisonia costata, *Choisy;* Baker, Flora, p. 263.
Dupont 51; *Fryer* 103.
Distr. Mauritius.
I am not quite sure about the specific identity of the Aldabra specimens with the type from Mauritius, the material being insufficient to decide the point.

Amarantaceae.

Deeringia celosioides, *R.Br.*; Wight, Icon. t. 728.
Fryer 85; *Fox* 207.
Distr. China, India, Malaya, Polynesia, Australia.
The Aldabra form is that with simple racemes terminating short leafy branchlets.

Deeringia indica, *Zoll.* Syst. Verzeichn. 110; non Retz. nec Spreng. Ile Picard, Dupont 26.
Distr. Malay Peninsula, Philippine Islands, Celebes, New Guinea. This differs from *D. celosioides*, R.Br., in having solitary axillary spikes much shorter than the leaves, but with rather larger flowers.

Achyranthes aspera, *L.*; Baker, Flora, p. 268; *Kew Bull.*, 1894, p. 150; Schinz in Abhandl. Senckenb. xxi. p. 83.
Abbott; *Fox* 233; *Thomasset* 230; *Voeltzkow.*
Also St. Pierre, Dupont 22.
Distr. Tropics of both hemispheres.

Apterantha oligomeroides, *C. H. Wright* in *Kew Bull.*, 1918, p. 203.
Dupont 56, *Thomasset* 237.
Distr. Endemic.

Celosia madagascariensis, *Poir.*, Encycl. v. p. 39. *Celosia phytolaccæfolia*, Juss., DC. Prodr. xiii. 2. p. 253.
Fox 240, 248.
Distr. Madagascar.

Amarantus tristis, *L.*
Thomasset 237.
Distr. Tropical regions.

Chenopodiaceae.

Salicornia pachystachya, *Bunge?* Ungern-Sternberg, Versuch einer Systematik der Salicornieen, pp. 42, 51.
Fryer 49.
Distr. Madagascar.
Salicornia pachystachya, Bunge, is described as allied to *S. herbacea*, L., and the Aldabra plant might well be the latter; introduced perhaps in ballast. I have seen no other specimen of the genus from the Madagascar or Mascarene regions.

Loranthaceae.

Loranthus aldabrensis, *Turrill* in *Kew Bull.*, 1918, p. 203.
Thomasset 29, *Fryer* 8, *Dupont* 10.
Distr. Endemic.
Fox 241 (with immature fruits and leaves) and *Dupont* 107 (leaves and branches only) probably belong to this species.

Viscum triflorum, *DC.*; Baker, Flora, p. 134.
Fryer 48; *Thomasset* 216; *Dupont* 33.
Distr. Madagascar, Mauritius, Reunion.
[*Hernandia peltata* and *Cassytha filiformis* are not represented in the Aldabra collections at Kew, but they are likely to occur in the island as both are common in Seychelles and in several of the smaller islands near Aldabra as well as in the Mascarenes.

Euphorbiaceae.

Euphorbia Abbottii, *Baker* in *Kew Bull.*, 1894, p. 150; Schinz in Abhandl. Senckenb. xxi. p. 86.
Abbott; *Dupont*; *Voeltzkow*; *Fryer* 52.
Distr. Dupont records this from all the islands of the Seychelles region except Gloriosa, but not from the Seychelles Archipelago.

Euphorbia hirta, *Linn.*; N.E.Br. in Dyer Fl. Trop. Afr. vol. vi. sect. i. 496. *E. pilulifera*, Jacq.; Baker, Flora, p. 303.
Fryer 100.
Distr. A common weed in the tropics.

Euphorbia hypericifolia, *L.*; Baker, Flora, p. 303; N.E.Br. in Dyer Fl. Trop. Afr. vol. vi. i. p. 498.
Fox 292.
Distr. Tropical and subtropical countries of both hemispheres.

Euphorbia prostrata, *Ait.*; Baker, Flora, p. 302.
Fox 224; *Dupont* 53, 203; *Thomasset* 232.
Distr. Tropical Africa and America.

Wielandia elegans, *Baill.*; Hemsl. in Hook. Ic. Pl. t. 2813.
Fryer 84.
Distr. Also in Seychelles.

Phyllanthus casticum, *Willem.*; Baker, Flora, p. 311.
Dupont 7.
Distr. Madagascar, Mauritius.

Phyllanthus Cheloniphorbe, *Hutchinson* in *Kew Bull.*, 1918, p. 204.
Abbott; *Thomasset* 227; *Dupont* 66, 112, 116; *Fryer* 17, 35, 87.
A small soft-wooded tree the leaves of which are eaten by tortoises (Dupont).
Distr. Endemic.

Phyllanthus maderaspatensis, *L.*; Baker, Flora, p. 309.
Thomasset.
Distr. Tropics of the Old World.

Acalypha claoxyloides, *Hutchinson* in *Kew Bull.*, 1918, p. 205.
Abbott; *Fryer* 18; *Thomasset* 243
Distr. Aldabra, Astove, Cosmoledo.

This is the "*Claoxylon* near *C. indicum*, Hassk." referred to in *Kew Bull.* 1894, p. 150. According to Thomasset it is one of the commonest shrubs in Astove, Cosmoledo and Aldabra. Both it and the following species are closely related to the Tropical East African *A. fruticosa*, Forsk.

Acalypha Fryeri, *Hutchinson* in *Kew Bull.*, 1918, p. 206.
Fryer 92.
Distr. Endemic.

Moraceae.

Ficus (Urostigma) aldabrensis, *Baker* in *Kew Bull.*, 1894, p. 151; Dupont, Report, 1907, p. 40.
Abbott; *Dupont* 39; *Fryer* 31; *Thomasset* 220, 253.
Distr. Dupont reports this species from Astove, Cosmoledo, Assumption and Gloriosa.

Ficus consimilis, *Baker*, Flora, p. 286; Balfour, Bot. Rodriguez, reprint, p. 67.
Fryer 13, 30, 33; *Thomasset* 219. *Dupont* 38.
Distr. Seychelles and Rodriguez.

Ficus nautarum, *Baker*, Flora, p. 285; *Kew Bull.*, 1894, p. 151; Schinz. Abhandl. Senckenb. xxi. p. 83; Dupont, Report, 1907, p.
Abbott; *Fryer* 14.
Distr. Mauritius, Seychelles. Dupont records this species from all of the islands in his tabular view.

Urticaceae.

Obetia morifolia, *Baker* in Journ. Linn Soc., Bot., xx. 263 (1883).
Dupont 127; *Fryer* 17.
Distr. Also in Madagascar.

Casuarinaceae.

Casuarina equisetifolia, *Forst.;* Baker, Flora, p. 294; Schinz in Abhandl. Senckenb. xxi. p. 81; Dupont, Report, 1907, p. 40.
Recorded by *Abbott*, *Gardiner* and *Voeltzkow*, though not collected by them.
Distr. Dupont records this from all the islands in his table, and also from Madagascar and the Mascarenes. It is supposed to be a native of the Malay Archipelago, but it seems to have spread widely independently of human agency.

Orchidaceae.

Although a number of Orchids inhabit Seychelles and members of the family are numerous in the Mascarenes, no species is recorded from any of the islands dealt with in this paper except Aldabra and Agalega. Absence or great rarity of Orchids is the rule in the vegetation of coral islands and other remote islands.

Acampe sp. aff. **A. Renschiana,** *Reichb. f.* Otia Bot. Hamb. p. 77.
Fox 287; *Fryer.*
Distr. Madagascar is the native country of the species named.

Angraecum eburneum, *Thouars*; Baker, Flora, p. 356.
Fox 288.
Distr. Seychelles; Bourbon.
In addition to the foregoing there were in Dupont's collection a flowerless branch of an orchid, probably an *Angracecum*, and a detached seed-pod.

Commelinaceae.

Commelina benghalensis, *L.*; Baker, Flora, p. 324.
Fryer.
Distr. Tropical Africa and Asia.

Dioscoreaceae.

Bioscorea nesiotis, *Hemsl.* in Journ. Bot., 1917, p. 288.
Thomasset 218, 241.
Distr. Also collected by Dupont in Assumption n. 118. A specimen of a different species probably was collected by Fox, n. 274.

Liliaceae.

Asparagus umbellulatus, *Sieber*; Baker, Flora, p. 377; *Kew Bull.*, 1894, p. 151; Dupont, Report, 1907, p. 41.
Abbott; *Dupont*; *Fryer* 4.
Distr. Mascarenes.
Dupont records this plant from Astove, Cosmoledo and Assumption. Concerning this plant Mr. C. H. Wright remarks: "This does not agree with typical *A. umbellulatus*, but is connected with it by Johnston's no. 16. I regard *A. umbellulatus* as a variable species, for one branch on Fryer's no. 4 bears cladodia like those on the type."

Lomatophyllum borbonicum, *Willd.*; Baker, Flora, p. 374; *Kew Bull.*, 1894, p. 151; Schinz in Abhandl. Senckenb. xxi. p. 82; Abbott in *Kew Bull.*, 1893, p. 155; Dupont, Report, 1907, p. 41.
Abbott; *Dupont*; *Fryer* 3; and all other collectors.
Distr. Madagascar, Mascarenes.
And, on the authority of Dupont, also Astove, Cosmoledo and Assumption.
This is doubtless the "Aloe-like plant" of Abbott, who states that it was the most conspicuous in Aldabra.

Dracaena reflexa, *Lam.*; Baker, Flora, p. 375; *Kew Bull.*, 1894, p. 151; Dupont, Report, 1907, p. 41.
Abbott; *Dupont.*
Distr. Tropical Africa; Madagascar; Mascarenes.
Dupont records *Dracaena reflexa* from Astove, Cosmoledo, Assumption and Seychelles.

Pandanaceae.

Pandanus Vandermeeschii, *Balf.* in Baker, Flora, p. 398; Schinz in Abhandl. Senckenb. xxi. p. 81; Dupont, Report, 1907, p. 41. *Foullioya maritima*, Gaud., Voy. de la Bonite, t. 26, f. 21-24.
Dupont; *Fryer*.
Distr. Mascarenes.
There is some doubt about this being the same species as that from the outlying islets of Mauritius.

Naiadaceae.

Cymodocea ciliata, *Ehrenb.* ex Aschers. in Sitzber. Gesellsch. Naturf. Freunde, Berl. 1867, p. 3.
Fox 218; *Fryer*.
Distr. Red Sea, Indian and Pacific Oceans.
Cymodocea is not recorded in Baker's Flora; but Professor Stanley Gardiner has some most interesting notes on the genus, inaccessible to me now.

Cymodocea rotundata, *Aschers.*; Fl. Trop. Afr. viii. p. 230.
Fox 206, 217.
Distr. Red Sea; Indian Ocean.

Cyperaceae.

(By W. B. Turrill.)

Cyperus compressus, *L.*; Baker, Flora, p. 410; Cordemoy, Fl. Réunion, p. 129.
Abbott.
Distr. Tropical and subtropical regions of both hemispheres.

Cyperus articulatus, *L.*; Fl. Trop. Afr. viii. p. 356.
Fox 295.
Distr. Tropical and sub-tropical regions of both hemispheres.

Cyperus sp., near **C. debilissimus,** *Baker* in Journ. Linn. Soc., Bot., xxii. 1887, p. 532.
Fox 231.
Distr. Madagascar.

Cyperus compactus, *Lam.*; Baker, in *Kew Bull.*, 1894, p. 151; Schinz in Abhandl. Senckenb. xxi. p. 82; Dupont, Report, 1907, p. 41.
Abbott; *Dupont* 85; *Fox* 277; *Thomasset* 231, 252.
Distr. Tropical and South Africa and the Mascarene Islands.

Mariscus rufus, *H.B.K.* Nov. Gen. et Sp. i. p. 216, t. 67.
Dupont 52; *Fryer* 25; *Thomasset*.
Distr. Mascarenes; Africa; Madeira; Tropical America.

Mariscus Dregeanus, *Kunth*; Fl. Trop. Afr. viii. p. 380.
Fryer 26, 27.
Distr. Tropical and South Africa, Mascarene Islands, India and Malaya.

Fimbristylis obtusifolia, *Kunth;* Baker in *Kew Bull.*, 1894, p. 151; Dupont, Report, 1907, p. 41.
Abbott; *Fox* 276; *Fryer* 24; *Thomasset* 250.
Distr. Tropical and South Africa, Mascarenes and tropical America.

Fimbristylis spathacea, *Vahl,* formae; *Fimbristylis glomerata,* Nees, formae; Baker, Flora, p. 419.
Dupont 17; *Thomasset* 263.
Distr. Common in all the Mascarene Islands.
Small plants, less rigid, with finer leaves and laxer inflorescences of fewer spikes than in the type.

Fimbristylis ferruginea, *Vahl*; Baker, Flora, p. 419; Cordemoy, Fl. Réunoin, p. 131.
Dupont 17; *Fryer* 12, 28.
Distr. In tropical and warm temperate countries nearly throughout the world.

Gramineae.

(By O. Stapf.)

Ischaemum rugosum, *Sal.*
Fox 230.
Distr. Throughout the Indo-Malayan region.

Digitasia horizontalis, *Willd.; Panicum sanguinale* var. *ciliare* (partly), Baker, Flora, p. 435.
Fryer.
Distr. Throughout Tropical Africa, the Mascarenes and Tropical America.

Panicum maximum, *Jacq.*; Baker, Flora, p. 436; Schinz in Abhandl. Senckenb. xxi. p. 82.
Fox 208; *Voeltzkow* 33, 38.
Distr. A native of Tropical Africa and Sub-tropical South Africa, introduced into most warm countries and often grown for fodder.

Panicum Meyerianum, *Nees.*
Dupont 75, 99; *Fryer*; *Fox* 293.
Distr. Eastern Tropical Africa, Natal, Madagascar, Tropical Arabia.

Stenotaphrum subulatum, *Trinius*; Baker, Flora, p. 440.
Dupont 55.
Distr. Galega, Mascarenes, Polynesia, including New Caledonia.

Pennisetum setosum, *Rich.*; Baker, Flora, p. 441, in nota. *Pennisetum polystachyum,* Schutes; Schinz in Abhandl. Senckenb. xxi. p. 82; Dupont, Report, 1907, p. 41.
Dupont; *Voeltzkow.*
Distr. Widely distributed through the tropics of both hemispheres.

Sporobolus virginicus, *Kunth*; Baker, Flora, p. 449, under *Vilfa.*

Dupont 67, 74; *Gardiner.*

Distr. A very variable littoral plant of most warm countries.

Eragrostis riparia, *Nees.*

Dupont 40, 64, 109, 202; *Thomasset* 223, 229; *Fryer* 4; *Fox* 237, 252.

Distr. India; Mascarenes; probably also East Africa.

Dupont 64 and *Fryer* 4 are noteworthy on account of the remarkably stiff and stunted habit.

Sclerodactylon juncifolium, *Stapf.* in *Kew Bull.*, 1911, p. 318.

Dupont 72, 105; *Fryer.*

Also Piquart or West Island, from sea shore along coast near settlement, Baty.

Distr. Madagascar.

Enteropogon melicoides, *Nees.*

Dupont 268; *Fryer*; *Thomasset* 249.

Distr. India; East Africa; Mascarenes; Assumption, *Fox* 238, 257.

Chloris radiata, *Swartz.*

Dupont 34; *Thomasset* 222.

Distr. Tropical America and Africa; Polynesia; introduced in other hot countries.

Dactyloctenium aegyptiacum, *Willd.*; Baker, Flora, p. 452; Schinz in Abhandl. Senckenb., xxi. p. 81.

Fryer; *Voeltzkow.*

Distr. Widely spread throughout the tropical and subtropical regions.

Dactyloctenium pilosum, *Stapf*, species nova, affine *D. aegyptiaco*, Willd., sed gracilius, spicarum lana et spicularum armatura distinctum.

Perenne (?). Culmi e basi saepe longe prostrata e nodis ramosa et radicante ad 1·2 dm. ascendentes, secundarii (rami) suberecti vel geniculato-ascendentes saepe fasciculati, 4-5 (rarius pluri-) nodi, internodiis magis minusve compressis vel superioribus teretibus glabris, demum plerumque magis minusve exsertis. *Foliorum* vaginae striatae, superne saepe subcarinatae, laxiusculae vel summae primo subinflatae, glabrae, nisi os versus pilosae vel barbatae; ligulae ad marginem membranaceum redactae; laminae lineares, tenuiter acutae, 2·5 cm. longae, 1-2 mm. latae, glaucescentes, praeter barbas orales glabrae vel parce pilosae pilis saepe e tuberculis ortis, ad margines superne scabrae, nervis obscuris vel infra prominulis paucis. *Spicae* 2-nae, rarius solitariae, rarissime 3-nae, 1·5-3·5 cm. longae, rectae vel demum falcato-recurvae, pallide glauco-virentes, deinde stramineae, densissimae; rhachis circiter 1 mm. lata, in dorso subacute vel obtuse carinata, ad spicularum insertiones lana parca spiculis paulo vel subduplo breviore stipata, caeterum glabra, apice in

spinam brevem producta. *Spiculae* anthoeciis 3-5 quorum infimum vel 2 infima ♀, caetera redacta ♂ vel neutra, ambitu late ovatae vel subrotundae, $1\frac{3}{4}$-2 mm. longae, a latere admodum compressae, densissime imbricatae, tardissime delabentes; rhachilla tenax, glabra. *Glumae* circiter 3 mm. longae, inferior a latere visa oblique oblonga vel sublanceolata, acuminata vel subacuta, 1-nervis carinata, carina scabra, superior (ad rhachis marginem spectans) a latere visa oblique oblonga vel elliptico-oblonga, apice emarginata, nervo carinali sublaeve in mucronem brevem spinescentem eius curvaturam continuentem abeunte. *Anthoecia* perfecta ♀ spiculam aequantia, subacuminata, breviter vel brevissime mucronata, nervo carinali scaberulo, lateralibus tenuissimis; valvula valva (mucrone dempto) paulo brevior, carinis ciliolatis scabrisque. *Antherae* 1·4 mm. longae. *Caryopsis* lateraliter compressa, elliptico-quadrata, 0·8 mm. longa, 0·65 mm. lata, minute granulata, ferruginea. *Anthoecia* imperfecta quam perfecta minora, vix vel haud mucronata, caeterum iis similia, nisi angustiora.

Seychelles. Praslin, *Dupont* 30.

Mascarenes. Aldabra *Dupont* 70. *Thomasset* 228. Assumption, *Fox* 254.

The spikes of *Dupont* 70 (mature) and most of *Thomasset* 228 (young) are very markedly falcate, those of *Dupont* 30 (mature) and *Fox* 254 (young) straight or almost so.

Lepturus repens, *R. Br.*

Dupont 89; *Thomasset* 234, 248.

Distr. Coasts of the Indian Ocean and the Pacific.

A slender narrow-leaved state as occurs occasionally throughout the area of the species.

Filices.

Acrostichum aureum, *L.*; Baker, Flora, p. 514; Christensen in Trans. Linn. Soc., series 2, Bot., vii. pp. 411, 423; Dupont, Report, 1907, p. 41; Stanley Gardiner in Trans. Linn. Soc., Zool., xiv. (1910) p. 4.

Dupont 36.

Distr. Almost cosmopolitan in salt marshes in tropical and sub-tropical regions. But it is not recorded from any of the other atolls within our area, and it is the only fern known to inhabit Aldabra. It is sometimes called the Mangrove Fern.

Regional and Endemic Plants of Aldabra.

The following is a list of species comprising the indigenous element, or the bulk of the indigenous element, in the Flora of Aldabra, inclusive, of course, of the endemic species, but exclusive of widely dispersed plants. Regional is employed in a geographical sense and covers East Africa, Madagascar, Seychelles and the Mascarenes, as well as the small islands of the Western Indian Ocean. Endemic species are marked with an asterisk.

Cleome strigosa, E. Afr., Astove, Gloriosa.

**Maerua Dupontii.*
Capparis galeata, Trop. Afr., Astove.
**Grewia aldabrensis.*
**Grewia salicifolia.*
**Erythroxylon acranthum.*
**Ochna Fryeri.*
Apodytes mauritiana, Cosmoledo, Astove, Gloriosa.
Gouania Retinaria, Masc.
Gouania tiliaefolia, Masc.
Allophylus africanus, E. Afr.
Macphersonia madagascariensis, Mad., Assumption, Cosmoledo, Astove.
**Tephrosia aldabrensis.*
**Cassia aldabrensis.*
**Pithecolobium ambiguum.*
Gagnebina tamariscina, Mad., Cosmoledo.
Desmanthus Commersonianus, Mad.
Weihea Tomassetii, Nossi Bé.
Terminalia Fatraea, Mad.
**Oldenlandia species nova?*
Tarenna nigrescens, E. Afr., Seych.
**Tricalysia cuneifolia.*
Polysphaeria multiflora, E. Afr. Assumption.
Plectronia bibracteata, Seych., Mauritius.
Pavetta trichantha, Assumption.
**Pavetta supra-axillaris.*
Psychotria Pervillei, Seych.
Trainolepis Hildebrandtii, Mad., E. Afr.
Rutidea coriacea, Masc.
**Vernonia aldabrensis.*
**Plumbago parvifolia.*
Plumbago aphylla, Assumption, Cosmoledo, Astove, Gloriosa.
Sideroxylon inerme, E. Afr.
**Jasminum aldabrense.*
Salvadora angustifolia, Mad.
Microstephanus cernuus, E. Afr., Mad., Assumption, Astove.
Sarcostemma viminale, E. Afr., Mad., Assumption, Cosmoledo, Astove.
Secamone Fryeri, Assumption.
Solanum aldabrense, Assumption, Cosmoledo, Astove, St. Pierre.
Hypoestes aldabrensis, Assumption, Astove.
Hypoestes serpens, Mad.
Nesogenes Dupontii, Assumption.
Clerodendron minutiflorum, Assumption, Cosmoledo.
Pisonia costata, Mauritius.
Celosia madagascarensis, Mad.
**Apterantha oligomeroides.*
Salicornia pachystachya, Mad.
**Loranthus aldabrensis.*
Viscum triflorum, E. Afr., Mad., Seych.
Euphorbia Abbottii, Assumption, Cosmoledo, St. Pierre.

Wielandia elegans, Seych.
Phyllanthus casticum, Mad., Masc.
**Phyllanthus Cheloniphorbe.*
Acalypha claoxyloides, Cosmoledo, Astove.
**Acalypha Fryeri.*
Ficus aldabrensis, Assumption, Cosmoledo, Astove, Gloriosa.
Ficus consimilis, Seych.
Ficus nautarum, Seych., Assumption, Cosmoledo, Astove, St. Pierre, Gloriosa.
Obetia morifolia, Mad.
Acampe Renschiana ? Mad.
Angraecum eburneum, Seych., Bourbon.
Dioscorea nesiotis, Assumption.
Asparagus umbellulatus, Assumption, Cosmoledo, Astove.
Lomatophyllum borbonicum, Mad., Assumption, Cosmoledo, Astove.
Dracaena reflexa, E. Afr., Mad., Assumption, Cosmoledo, Astove.
Pandanus Vandermeeschii, Masc. (?).
Sclerodactylon juncifolium, Mad.
Dactyloctenium pilosum, Assumption, Seychelles.

The list contains 68 species, of which 18 are endemic, 13 are limited to Aldabra and the small neighbouring islands of Assumption, Cosmoledo, Astove, St. Pierre and Gloriosa, whilst 18 extend to Madagascar, and 11 reach East Africa. Prominent among the genera found in Aldabra, but apparently absent from the small islands nearest to it are: *Grewia*, *Erythroxylon*, *Gouania*, *Tephrosia*, *Pithecolobium*, *Cassia*, *Lumnitzera*, *Sonneratia*, *Tarenna*, *Tricalysia*, *Plectronia*, *Guettarda*, *Psychotria*, *Triainolepis*, *Rutidea*, *Vernonia*, *Salicornia*, *Viscum*, *Loranthus* and *Angraecum*. Seven of these belong to the Rubiaceae, an order scarcely represented in the smaller islands. Of course it must always be remembered that Aldabra has been much more thoroughly explored than the rest of the islands.

Introduced Plants.

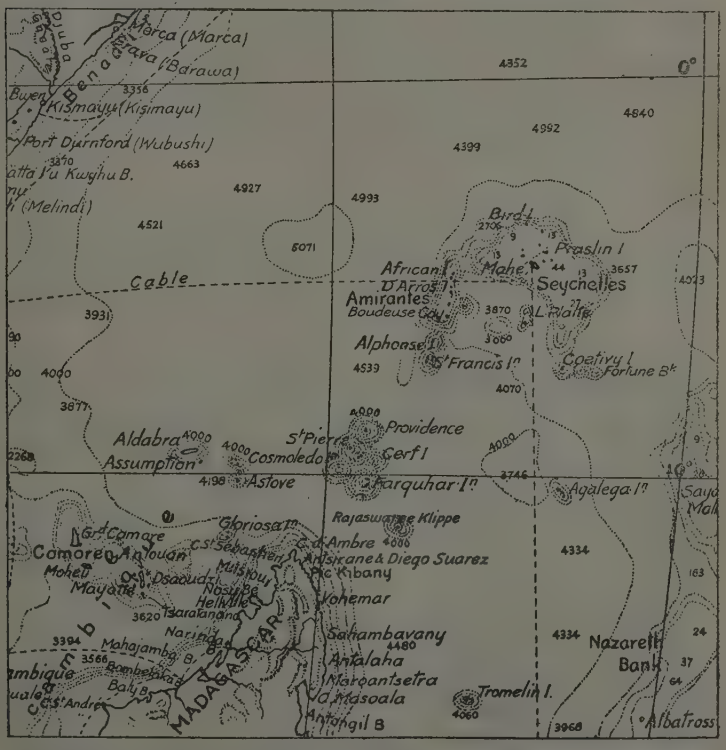
In addition to the plants included in the enumeration as probably indigenous, that is having reached Aldabra independently of active human agency, there is a number of undoubtedly introduced plants now existing in a more or less wild condition. Such are: *Amaranthus tristis*, *A. gangeticus*, *Brassica nigra*, *Carica Papaya*, *Gossypium barbadense*, *Ocimum canum*, *Ricinus communis and Lochnera rosea*. Doubtless some of those included in the enumeration might with equal justice be referred to the category of introduced plants.

The Coco-Nut.—I have not included *Cocos nucifera* in the enumeration of plants which have presumably reached Aldabra independently of the action of man, because I am now convinced that it is a native of South America, the home of all the numerous species of the genus *Cocos*, and that its present distribution is due almost entirely to human agency. Reliable

observers state that nuts cast ashore by the waves do not germinate unless buried in the soil. There is also good evidence that the Polynesians and other races carried nuts with them wherever they went on their sea-voyages and planted some in the most remote islands, as a provision against emergencies. Mr. O. F. Cook, in a masterly essay on the subject, fully proves, in my estimation, that *Cocos nucifera* is a native of inland stations in South America, so that it is not, as is commonly supposed, essentially a littoral palm, though it thrives in such situations.

Flora and Vegetation of some other small Islands of the Western Indian Ocean.

Within what may be termed the Seychelles area, and mainly to the south-west of that group, there is a number of islands—atolls, similar in size and physical characters to Aldabra. Several of these islands were visited by Dupont, Fryer, Gardiner and Thomasset, and some of them by earlier travellers, all of whom have contributed more or less to our knowledge of their



flora. But none of these islands has been so thoroughly explored, botanically, as Aldabra. Nevertheless, it seems desirable to reproduce here such data and records as are helpful in

comparisons. For this purpose also some particulars are extracted from Prain, Stanley Gardiner, Willis and the present writer's accounts of the botany of the more easterly Laccadives, Maldives and the Chagos Archipelago.

Assumption.

Dupont remarks of Assumption that its flora resembles more closely that of Aldabra than some of the other neighbouring islands. Out of 97 Aldabra species he records in his distribution table 40 as occurring in Assumption. Among these are *Polanisia strigosa, Capparis galeata, Thespesia populnea, Hibiscus tiliaceus, Scutia Commersonii, Schmidelia africana, Macphersonia madagascariensis, Guettarda speciosa, Plumbago aphylla, Solanum aldabrense, Sarcostemma viminale, Cassytha filiformis, Ficus nautarum, F. aldabrensis, Euphorbia Abbottii, Casuarina equisetifolia, Lomatophyllum borbonicum, Dracaena reflexa, Asparagus umbellatus, Dioscorea nesiotis* and *Fimbristylis exilis*.

A later numbered collection by Mr. Dupont includes the following additional species: *Cissampelos Pareira* (in a broad sense), *Sida diffusa, Suriana maritima, Cannavalia obtusifolia, Launaea bellidifolia, Oldenlandia corymbosa, Pavetta trichantha, Polysphaeria multiflora, Secamone Fryeri, Justicia procumbens, Hypoestes aldabrensis, Nesogenes Dupontii, Clerodendron minutiflorum, Celosia phytolaccifolia*, and *Panicum assumptionis*, Stapf (sp. nov.).

Fryer contributes *Pemphis, Plumbago, Microstephanus, Euphorbia Abbottii, Ficus* and *Dracaena*. And Fox adds: *Eriochloa subulifera*, Stapf. (sp. nov.), 256, 261; *Stenotaphrum clavigerum*, Stapf (sp. nov.), 255; *Eragrostis riparia*, Nees, 237, 252; and *Dactyloctenium pilosum*, Stapf (see p. 135), 254. Descriptions of the 3 new species by Dr. Stapf are appended here.

Panicum assumptionis, Stapf; species nova; affine *P. pinifolio*, Chiov. (syn. *P. Appletonii*, Stapf), sed caulibus multo gracilioribus, foliorum laminis multo tenuioribus molliter hirsutis acutis planis haud aciniformibus, spiculis minoribus distinctum.

Perenne; rhizoma breve, mox dissolutum, aut fasciculos culmorum erectorum vel longe ascendentium et radicum fibrillos tenues e basi emittentium aut soboles prostratos edens, innovationibus foliatis additis. *Caules* sobolesque tenues, longiores ad 2 dm. longi internodiis 1·2–2 rarius ultra 2·5 cm. longis, e nodis omnibus fasciculatim ramosi vel inferne simplices, ramis longioribus interdum eodem more ramulosis, ramorum ramulorumque fasciculis circiter 2 cm. longis densis. *Foliorum* vaginae firmae, breves, glabrae vel interiores fasciculorum parce pilosae, basales 5 mm. longae, culmorum primariorum duplo longiores, sensim in laminas abeuntes et cum iis longe persistentes, fasciculos ramulorum suffulcientes, eae fasciculorum multo breviores; ligulae ad lineam pilorum redactae; laminae lineari-lanceolatae vel sublineares, acutae vel tenuiter

acuminatae inferiores et culmorum primariorum 3·5-2 cm. longi, ad 3 mm. lati, secundariorum et ordinum superiorum 1 cm. longi vel breviores angustioresque, dorso laxe molliter hirsutae, omnes e vernatione convoluta mox explanatae. *Paniculae* numerosae in ramulis fasciculorum, eos vix superantes, 1 cm. longae; axis primaria et rami patuli vel recurvi, vix 5 mm. longiores, tenuiter filiformes, pilosi; pedicelli laterales ad 1·5 mm. longi, apice paululo dilatati. *Spiculae* ovoideo- vel obovoideo-ellipsoideae, subacutae, 1·25 mm. longae, glabrae, viridulae, deinde pallescentes. *Glumae* membranaceae, inferior late ovata, acuta vel subacuta, basi amplectens, 1-nervis, superior spiculam aequans et eodem ambitu, 5-nervis, nervis superne prominulis. *Anthoecium* inferum neutrum: valva glumae superiori simillima; valvula nulla. *Anthoecium* superum ♂, infero vix brevius, maturum fuscescens: valva elliptica, obtusa, papyracea, 5-nervis; valvula substantia simillima, vix brevior, utraque laevis, nitens. *Antherae* 0·75 mm. longae.

Mascarenes. Assumption Island, on rocky ground, *Dupont*, 110.

Eriochloa subulifera, *Stapf*, species nova; affinis *E. acrotrichae*, Hack. ex Thellung, sed racemis laxis, pedicellis elongatis, spiculis dissitis minoribus pro ratione longius aristulatis distincta.

Annua, ultra 5 dm. alta, gracilis. *Culmi* solitarii vel parce fasciculati, tenues, geniculatim ascendentes, 3-4-nodi, e nodis inferioribus ramosi, glabri, nisi sub paniculam parce pilosi. *Foliorum* vaginae sublaxae, tenuiter striatae, glabrae, interdum pubescentes, intermediae et superiores quam internodia breviores; ligulae ad lineam ciliolatam reductae; laminae lineares, apicem versus longe attenuatae, acutae, basin versus aequilatae vel paulo angustatae, 4-8 cm. longae, 1½-2½ lin. latae, tenues, glabrae, fere omnino laeves, nervo medio tenui. *Panicula* ambitu late oblonga, 4-9 cm. longa, 2·5-4 cm. lata, racemis 4-9 distantibus demum oblique erectis vel patulis, axi communi uti axibus ordinum superiorum undique pilosula pergracili. *Racemi* breviter pedunculati vel superiores subsessiles, 3·5-1·8 cm. longi, laxi, gracillimi; rhachis filiformis, angulata, 0·2-0·5 mm. lata, internodiis 2·5 mm. longis; pedicelli solitarii vel inferiores 2-nati, secundariis brevissimis, primariis ad 2·5 mm. longis, omnibus apice subdiscoideis. *Spiculae* dissitae, ovato-lanceolatae vel oblongae, subulato-aristulatae, annulo incluso sed aristula dempta 2·5 mm. longae, pallide virides, sericeae; internodium globosum basale 0·25 mm. diametro. *Gluma* inferior ad marginem membranaceum redacta, superior ambitu longitudine spiculae, tenuiter 5-nervis, aristula ultra 1 mm. longa. *Anthoesium* inferum ad valvam glumae superiori similem acutam emucronatam fere 3 mm. longam redactam. *Anthoecium* superum ♂; valva oblongo-elliptica, obtusa, 2 mm. longa, mucronulo fere 0·5 mm. longo barbellato. *Antherae* 1 mm. longae.

Mascarenes. Assumption Island, *Fox* 258, 261.

Stenotaphrum clavigerum, *Stapf*, species nova; affines *S. oostachyo*, Baker, sed annuum, multo gracilius et foliis angustis sursum longe attenuatis acutis, spicis gracilioribus ambitu plerumque ovato-lanceolatis distinctum.

Annuum, fasciculato-caespitosum, 2 dm. altum. *Culmi* pergraciles, glabri, erecti vel breviter geniculatim ascendentes, 8-nodi, e nodis inferioribus intermediisque crebre ramosis; rami inferiores culmos secundarios referentes. *Foliorum* vaginae laxae vel subtumidae, magis minusve compressae et superne carinatae, praeter nodos adpresse barbatos glabrae, tenuiter striatae, pallidae; ligulae ad marginem ciliatum reductae; laminae lineares, sursum longe attenuatae, acutae, 3-5 cm. longae, 2-3 mm. latae, vernatione plicatae, deinde saepe planae, tenues, subglaucae, glabrae vel interdum basi utrinque barbatae, margine scaberulae. *Spicae* solitariae pedunculo (internodio summo) circiter 3 cm. longo e vagina summa demum longe exserto sursum incrassato et ibi parce pilosulo suffultae, ambitu ovato-lanceolatae, rarius oblongae, 7-8 mm. longae, 2-2·5 mm. latae, leviter compressae, pallide virides, axi paulo ultra spiculas producta obtusa inter spiculas oblique constricta. *Spiculae* solitariae in excavationibus axis nidulantes vel sub anthesi magis minusve hiantes et divergentes, circiter 5 cum quaque spica, ad eius latera superpositae, 2 mm. logae. *Glumae* ad squamas albidis rotundatas vel (interior) lobulatas enerves 0·3-0·5 mm. longas reductae. *Anthoecium* inferum (exterior) ♂: valva a dorsa visa oblonga, acuta, superne carinata, spiculam aequans, chartacea, albida, laevis, 3-nervis; valvula valvae aequilongae, alato-2-carinata, obtusa; antherae 1·5 mm. longae. *Anthoecium* superum ♀ quam inferum paulo brevius: valva navicularis, acuta, tenuiter chartacea, 3-nervis; valvula valvam aequans, 2-nervis; antherae ut in ♂.

Mascarenes. Assumption Island, *Fox* 255.

Cosmoledo.

Baty specially mentions *Pemphis*, *Tournefortia*, *Carapa*, *Rhizophora* and *Casuarina* as inhabiting this atoll. Dupont also enters into some details of the mangrove vegetation, comprising the genera just mentioned with the addition of *Bruguiera*, *Ceriops*, and *Avicennia*. But he gives no general account of the vegetation. Fryer adds little, but he states that the type of vegetation characteristic in Aldabra is quite absent. Goëlette Island, on the east side of the atoll, he found, was "thickly studded with *Plumbago aphylla*, a herb which produces leaves at the beginning of the wet season but speedily loses them."

Dupont tabulates 43 species of plants from Cosmoledo, including *Apodytes*, *Plumbago*, *Solanum aldabrense*, *Sarcostemma*, *Ficus natutarum*, *F. aldabrensis*, *Cassytha*, *Euphorbia Abbottii*, *Casuarina*, *Lomatophyllum*, *Dracaena reflex* and *Asparagus umbellulatus*.

A later collection from Dupont adds: *Gouania tiliaefolia, Gagnebina tamariscina, Evolvulus alsinoides* and *Clerodendron minutiflorum.* A species of *Oxalis* (near *O. villosa,* Baker, a Madagascar species) was collected. This genus is not recorded from any of the other islands.

Astove.

Baty states that "the forest of Astove is composed of forest trees and flowers of Madagascar. Their growth is very stunted, but very thick, especially along a belt of 200 ft. near the lagoon. The commonest of all the trees is the Bois D'Amande" —*Pemphis acidula.*

Dupont's contribution to the Botany of Astove is limited to 39 species in his Distribution Table. These include *Hibiscus tiliaceus, Thespesia populnea, Apodytes mauritiana, Colubrina asiatica, Scutia Commersonii, Schmidelia africana, Macphersonia madagascariensis, Cordia subcordata, Solanum aldabrense, Astephanus arenarius, Avicennia marina, Pisonia macrophylla, Ficus nautarum, F. aldabrensis, Cassytha filiformis, Casuarina equisetifolia, Lomatophyllum borbonicum, Dracaena reflexa* and *Asparagus umbellulatus.* It will be realised that several of the plants named are common to Aldabra and not ordinary littoral types. It may be noted, too, that no true mangrove is recorded. Fox collected *Panicum maximum,* a widely cultivated species, in this island, no. 285.

Fryer has the following paragraph:—"The bush in places resembles Aldabra *Pemphis* scrub, and in others the open country of Assumption. It was very bare and dead during my visit, and hardly a score of plants were obtained in flower, though during the dry season it is supposed to be the most luxuriant of all the Aldabra series." He collected specimens of: *Polanisia strigosa, Capparis galeata, Plumbago aphylla, Sarcostemma viminale, Ipomoea biloba, Evolvulus alsinoides, Hypoestes aldabrensis, Asystasia coromandeliana and Boerhaavia diffusa.*

Farquhar.

The little that is known of the vegetation of these islands points to no peculiarities. Dupont has nothing on record. Concerning Farquhar, Gardiner says of South Island, "Although the islands are so close to Madagascar the plants were again the same as those of Chagos and Coëtivy. The coco-nuts of North Island had been nearly all blown down by a hurricane in 1893, but were still growing, having bent up through an angle of 90°, leaving 10 to 15 ft. of their stems lying prone on the ground. Near them were great groves of *Casuarina.*" *Pemphis, Scaevola* and *Tournefortia,* etc., appear in the illustrations.

Providence.

A sample of the flora of Providence, collected by Dr. R. W. Coppinger, on the cruise of the "Alert," 1878-82, follows here:—*Sida carpinifolia. S. spinosa, Abutilon indicum, Triumfetta procumbens, Cassia occidentalis, Desmanthus virgatus,*

Suriana maritima, Ochrosia borbonicum, Tournefortia argentea, Ipomoea glaberrima, Striga hirsuta, Boerhaavia diffusa, Hernandia peltata, Cassytha filiformis, Euphorbia pilulifera, E. prostrata, Fleurya aestuans, Cyperus ligularis, Fimbristylis glomerata, Eleusine aegyptiaca. This small collection is in the Kew Herbarium.

As will be seen these are all common and mostly sea-side species; but *Ochrosia borbonica* (*Apocynaceae*) and *Hernandia peltata* (*Lauraceae*) are additions to our insular floras, though both are common on the coast of Seychelles and may be expected to occur in Aldabra. Dupont tabulates only about fifteen of the Aldabra plants from Providence; all of the commonest.

St. Pierre.

Dupont tabulates 23 of the Aldabra plants as common to St. Pierre, among these *Hibiscus tiliaceus, Thespesia populnea, Brexia madagascariensis, Pemphis acidula, Terminalia Catappa, Scaevola, Tournefortia, Cordia, Solanum aldabrense, Pisonia macrophylla, Euphorbia Abbottii, Ficus nautarum* and *Casuarina.* Of these *Brexia* and *Terminalia Catappa* are not recorded from Aldabra, though the latter is likely to occur. *Brexia spinosa* is the variety recorded from St. Pierre; but the genus is apparently absent from all the other islands outside of the Seychelles group. All the forms of *Brexia* are usually referred to *B. madagascariensis*, which is common in some of the Seychelles Islands, and is found in Madagascar and East Africa. *Euphorbia Abbottii*, a shrubby species, belongs to a section, peculiar according to Baker, to the Mascarenes. Dupont records it from all the islands except Gloriosa. An apparently new species of *Hippocratea* (Hemsl. in Journ, Bot. 1916, Suppl. II. p. 9), St. Pierre, *Dupont* 4, is a "bushy climber not found elsewhere."

Although Dupont records so few species he states that "as regards its flora St. Pierre is much like that of Aldabra." On the other hand he does not tabulate any mangroves as growing in either of these three islands. The same with the Amirantes, Astove, Assumption, Comoros and Gloriosa. But this is probably due to an oversight or an accidental omission. Gardiner gives a few facts in the ensuing paragraph:—

"From the sea St. Pierre presents an appearance remarkably like one of the Tongan or Fijian raised coral islets. It is surrounded by perpendicular or overhanging cliffs varying up to about 30 ft. in height. At most parts the cliffs are crowned with old gnarled bushes of *Pemphis*. Inside is a dense mass of small trees—*Hibiscus*, with masses of red flowers, *Pisonia* with stunted stems never able to reach above the general level of 20 ft. or so, and the tanghin, the famous poison-tree of Malagasy natives.* The last presented an extraordinary spectacle as a

* Professor Gardiner informs me that this statement requires correction. The "tree with bare stems" is *Euphorbia Abbottii*. The Tanghin of the Malagasy is *Cerbera venenifera*, Steud. (*Tanghinia venenifera*, Poir.; *T. veneniflua* (err.), Hook. Miscell. iii. p. 289, t. 110). It attains considerable height and has the habit of a mango tree.—O. S.

forest of bare stems, being completely leafless, while most tropical trees gradually lose and replace their leaves. Other plants were of the reguar species which can stand the guano."

Gloriosa.

The following is a list of plants in the Kew Herbarium collected by Dr. Coppinger in Du Lise Island, Gloriosa. It has already appeared in my Introduction to the Botany of the Challenger Expedition:

Cleome strigosa, Portulaca quadrifida, Sida spinosa, Hibiscus Hornei, Thespia populnea, Pemphis acidula, Cucumis trigonus, Cordia subcordata, Ipomoea glaberrima, Solanum nodiflorum, Boerhaavia diffusa, Euphorbia prostrata, Cyperus rotundus, Eragrostis tenella. This is the only record of *Hibiscus Hornei* outside of Seychelles; but I have not been able to verify the determination.

In a sketch of the natural history of Aldabra Mr. Abbott remarks that Gloriosa seemed comparatively rich in plants. *Casuarina* and Mangroves are recorded by him; the latter "50-60 ft. high."

Dupont tabulates only 20 of the Aldabra plants as occurring in Gloriosa, and these are mostly widely dispersed species. Among them, however, are *Ficus nautarum, F. aldabrense, Apodytes mauritiana, Cassytha filiformis* and *Casuarina.* No Mangrove, no member of the *Rubiaceae* except *Guettarda speciosa*, and no monocotyledonous plant. *Cassytha* has apparently not been collected in Aldabra.

Amirante Group.

Kew possesses two small collections from this group, made by Dr. Coppinger. In Des Roches he collected: *Calophyllum Inophyllum, Sida spinosa, Abutilon indicum, Triumfetta procumbens, Suriana maritima, Morinda citrifolia* and *Vernonia cinerea.* And in Poivre: *Pemphis acidula, Guettarda speciosa, Tournefortia argentea, Casuarina equisetifolia. Vernonia cinerea* is an addition, but it is a common weed in the tropics of the Old World.

Dupont records only 20 species of plants from this group, mostly of the commonest, and including no mangroves, *Sarcostemma viminale, Ficus nautarum* and *Euphorbia Abbottii* being the only regional representatives.

Gardiner reports as follows of Poivre Island:—"As rich in coco-nuts as any we saw. The whole was overshadowed by a high clump of bois blanc, *Hernandia peltata*, while Casuarinas grew everywhere on the shore. Under the coco-nuts was a pleasing undergrowth of papayas, cassias, castor-oil and ferns; the first occurrence of the latter in any abundance since leaving the Chagos." Gardiner also mentions *Barringtonia speciosa*, hitherto not reported from Aldabra or any of our other small islands.

With the exception of *Acrostichum aureum* in Aldabra, this is the only record of ferns in the islands coming within our area west of theChagos Archipeago. Kew possesses no specimens of ferns from the Amirantes.

Coëtivy.

This island lies a little to the south of Seychelles, and was visited by the Sealark Expedition. We are indebted to Professor Gardiner for the following notes from the second part of his Description of the Voyage. Coëtivy is described as about six miles long by one-and-a-half across its broadest part.

"The character of the vegetation was the same as that which we found in the Chagos Archipelago on similar dry, sandy and tuff islands. It consists of low bush, formed mainly of *Scaevola* and *Erythroxylon*, the former with thick succulent stems and leaves like the laurel, and the latter with tiny leaves, yellow flowers, and stems covered with mossy lichens. The ground between was mainly covered with isolated plants of a low rush (sedge ?), while struggling clumps of the hairy-leaved *Tournefortia* and of the thinner-leaved *Pisonia* we found here and there. Probably there were not 20 species of plants altogether on this kind of land, but the lower patches yielded a more considerable variety of species. These, when compared, proved to be almost precisely the same as those obtained from the Chagos. This was to us a source of considerable astonishment, because, from the island being so much nearer to Africa, to Madagascar, to the Seychelles, and to many other islands which might serve as stopping-places from the more distant lands, we had certainly expected to find a considerably greater variety of plants. Actually, we catalogued 92 species as against 85 in the Ile du Coin Peros, Chagos; the increase being mainly due to rather more plants of cultivation. The only new group of trees were the vacoa (*Pandanus*), of which, though formerly very widely spread, there were left only two clumps. The badamier, *Terminalia Catappa*, was certainly indigenous, whereas it has possibly been introduced into Chagos. Finally the gayac (*Afzelia*) was the only absentee that our lists show among the indigenous trees of the Chagos."

I have not seen the plants collected by Dr. Simpson in Coëtivy. The cases of *Afzelia* and *Pandanus* are interesting, for we may assume that these trees have disappeared from some of the islands under consideration here.

Agalega.

There is a report by G. Lincoln on the coco-nut industry of Agalega, but it contains no botany.

Nesogenes prostrata is only known from the Agalega Islands. There are several specimens in the Kew Herbarium, probably all collected by Bouton.

Baker records the following plants from Agalega, all or nearly all collected by Bojer:—*Afzelia bijuga*, *Radamaea prostrata* (*Nesogenes prostrata*, Hemsl.), *Pisonia macrophylla*, *Pipturus argenteus*, *Disperis tripetaloides* (*Orchidaceae*), and *Stenotaphrum subulatum*. Noteworthy among these plants are *Afzelia*, *Nesogenes* and *Pipturus argenteus* which Baker suggests may be "a mere variety of *P. incanus*," a species of Seychelles, Malaya and Polynesia. The orchid is the only one recorded from these islands outside of Aldabra.

Cargados.

This group, and Albatross Island, is situated about 6° south of any of the other islands dealt with here, and about 4° north-east of Mauritius. According to Gardiner the "expedition landed on Establishment Island, where fish-curing was carried on. An attempt was being made to cultivate a few gourds and marrows, but the soil was evidently of the most inhospitable description; bois manioe, *Scaevola*, and bois de balais, *Erythroxylon*, alone flourishing. A few *Cocos* were coming up, and there was a small grove of *Casuarina*, a tree which seems to be capable of withstanding almost any conditions of drought and salinity. Here and there are clumps of low bush—*Erythroxylon* or *Tournefortia*—matted together by the liane sans fin, *Cassytha filiformis*."

Siren and two Bird Islands were also visited, but only ten kinds of plants were observed, including the above-named and *Pisonia*.

The Laccadive Islands.

As long ago as 1890 Sir David Prain published an account of the plants of the Laccadives, which is much more than a list, as it includes a careful analysis of the constituents of the vegetation and the general distribution of the probably indigenous species. The emuneration comprises 80 species, including 17 in the strictest sense cultivated, and the author at a later date kindly communicated the names of 20 additional species; all more or less widely distributed plants. The distribution table of the species is divided into 14 areas, including 6 insular ones, and shows at a glance that the plants are mostly nearly cosmopolitan in warm countries. There is no endemic species; all are Indian; all except 7 are recorded from Ceylon, and all except 12 are known to inhabit the Malay Archipelago. 55 of the 80 species are also recorded from Mauritius; 56 from continental Africa; 50 from Australia, and 45 from Polynesia. It should be borne in mind that there is nothing absolute about the foregoing figures; but they prove that the vegetation of the Laccadives is composed solely of widely dispersed elements. The absence of *Casuarina*, *Cycas*, and Orchids is noteworthy. Only two ferns, *Nephrodium molle* and *Nephrolepis tuberosa*, both most widely diffused kinds, have been collected. Concerning the origin of the flora, Prain estimates that it is wholly derived and the agencies of introduction four, namely, Man, 70 per cent.; the Sea, 21¼ per cent.; Birds, 3¾ per cent. and winds 5 per cent.

The Maldive Islands.

Willis and Stanley Gardiner's Botany of this Archipelago is very comprehensive and of the comparatively recent date of 1901, and really embodies all that was known of the Flora of the Maldives, Laccadives and Chagos Archipelago. The combined floras number 359 species of vascular plants, "of which about 245 are cultivated, or weeds of cultivation; 73 probably introduced by sea; 28 by birds, and 13 by wind. The flora of these islands is undoubtedly recent and derived from abroad."

Chagos Archipelago.

The flora of this group has been little investigated, as compared with that of the Laccadives and Maldives; but, so far as it is known, it is of quite the same character and composition. A sample is afforded by the following list of plants collected by Dr. A. G. Bourne in Diego Garcia in 1885. Absence of mangroves and presence of 6 species of ferns is noteworthy; but it should be borne in mind that the list has no claim whatever to completeness. Several evidently introduced species are omitted:—

Sida diffusa, Triumfetta procumbens, Suriana maritima, Terminalia Catappa, Morinda citrifolia, Guettarda speciosa, Vernonia cinerea, Ageratum conyzoides, Scaevola Koenigii, Ochrosia borbonica, Asclepias curassavica, Cordia subcordata, Tournefortia argentea, Ipomoea (Calonyction) quadriflora, I. biloba, Herpestes Monniera, Striga hirsuta, Lippia nodiflora, Stachytarpheta indica, Premna serratifolia, Boerhaavia diffusa, Pisonia inermis, Achyranthes aspera, Rivina laevis, Cassytha filiformis, Hernandia peltata, H. ovigera, Euphorbia pilulifera, Phyllanthus Niruri, Acalypha indica, Casuarina equisetifolia, Cyperus ligularis, Kyllinga monocephala, Fimbristylis glomerata, Digitaria horizontalis, Stenotaphrum complantum, Asplenium aequabile, A. longissimum, A. falcatum, A. Nidus, Nephrodium unitum, Pteris marginata and Psilotum triquetrum.

The plants of the foregoing list were the subject of a paper by the writer, for particulars of which see bibliography, and the specimens are in the Kew Herbarium. Noteworthy facts are the total absence of *Rubiaceae*, except the widely dispersed *Morinda citrifolia*, and *Guettarda speciosa*, and the presence of ferns.

Plants Reported from the Smaller Islands Indicated Below, but not from Aldabra.

Hibiscus Hornei—Gloriosa.
Oxalis nr. *O. villosa*—Cosmoledo.
Hippocratea sp. nova?—St. Pierre.
Canavalia obtusifolia—Assumption, Cosmoledo.
Afzelia bijuga—Coëtivy, Agalega.
Desmanthus virgatus—Providence.
Brexia madagascariensis—St. Pierre.
Terminalia Catappa—St. Pierre.
Barringtonia speciosa—Amirantes.
Cucumis trigonus—Gloriosa.
Vernonia cinerea—Amirantes.
Ochrosia borbonica—Providence.
Ipomoea glaberrima—Providence, Gloriosa.
Striga hirsuta—Providence.
Nesogenes prostrata—Agalega.
Celosia phytolaccifolia—Assumption.
Hernandia peltata—Providence, Amirantes.
Cassytha filiformis—Assumption, Cosmoledo, Astove, Providence, Gloriosa.
Pipturus argenteus—Agalega.

Disperis tripetaloides—Agalega.
Fimbristylis exilis—Assumption.
Eriochloa subulifera—Assumption.
Stenotaphrum clavigerum—Assumption.
Panicum assumptionis—Assumption.
Dactyloctenium pilosum—Assumption.

With some noteworthy exceptions* the plants in the preceding list are regional and also occur either in Seychelles or in the Mascarenes, or in both groups. *Nesogenes prostrata* is apparently confined to Agalega, as well as *Pipturus argenteus*, if this be really specifically different from *P. incanus*.

Desmanthus virgatus is an American colonist. The *Disperis* is also recorded by Baker from Mauritius and Bourbon.

From the general distribution of these twenty-five species of plants, their absence from Aldabra may be considered as accidental. The arboreus *Afzelia bijuga*, *Terminalia Catappa*, *Barringtonia speciosa*, *Ochrosia borbonica* and *Hernandia peltata* may have fallen before the axe in Aldabra for building purposes. Other woody species may have been used up for fuel, while a few inconspicuous herbs may have escaped the eye of collectors.

Summary.

For convenience it may be repeated here that Aldabra is an atoll, similar in size to the Isle of Wight, being approximately 22 miles by 8. It is oblong-oval in outline and the land rim is broken up into 4 islands of very unequal size. The lagoon is about 20 miles by 6, and contains numerous small islands. In area the atoll is about 120 square miles, of which about half is lagoon, and the surrounding land rim is from 12-15 ft. above high water line.

Aldabra is situated some 600 miles from the Seychelles Archipelago, 400 from East Africa, and 240 from Cape Amber, the nearest point of Madagascar, with a number of similar atolls and coral reefs to the immediate east. Assumption, the nearest island, is about 20 miles distant, but this is exceptional in not being a true atoll, having no central lagoon.

All writers agree that Aldabra is densely clothed with vegetation, and my task of classifying the various collections brings to light the fact that this vegetation is unusually rich and varied in elements for an atoll flora, and comprises herbaceous, shrubby and arboreous species. Excluding species evidently introduced through human agency, direct or indirect, but including a number of uncertain arrival, the Flora of Aldabra comprises over 170 species of flowering plants and one fern—*Acrostichum aureum*. This fern is almost cosmopolitan in tropical salt marshes, including Seychelles and the Mascarenes, but it has not been observed in any of the other small islands dealt with in

* The occurrence of four endemic grasses in Assumption is remarkable. Of these *Eriochloa subulifera* is an African or in a wider sense an Indo-African type, whilst *Stenotaphrum clavigerum* has its nearest ally in Madagascar (*S. oostachyum*, Bak.), and *Panicum assumptionis* in Italian Somaliland (*P. pinifolia*, Chiov.). *Dactyloctenium pilosum* is a very marked member of the group represented by *D. aegyptiacum*, Willd.—O. S.

this paper. The species of flowering plants represent 127 genera and 54 families.

Similar proportions are characteristic of insular floras of both smaller and larger dimensions. Taking Bentham and Hooker's classification in a somewhat modified or extended sense, these 54 families constitute about one-fourth of the generally recognised families of the phanerogamic or flowering plants of the world. Over one-third (19) of these families are represented by only one species each, and, it follows, by only one genus each. 15 families are represented by only 2 species each, and 5 by 3 species, whilst 6 others number 4 species each. These 5 families account for 88 species or considerably more than half of the total number. For the rest, the Gramineae number 14 species; the Rubiaceae 15, and the Leguminosae 12. The average of species to a genus is rather less than 1·4 in the whole flora.

Noteworthy among the genera represented by only one species in Aldabra are *Erythroxylon*, *Ochna*, *Macphersonia*, *Sideroxylon*, *Jasminum*, *Salicornia*, *Viscum*, *Angraecum*, *Dioscorea*, *Lomatophyllum*, *Pandanus* and *Acrostichum*. Most of the genera named have a wide geographical area; but *Macphersonia* and *Lomatophyllum* are regional. There is only one genus of phanerogamia confined to the small islands under consideration, namely, *Apterantha* in Aldabra. The small number of *Compositae* (four) and the absence of *Labiatae* are remarkable; and the large and almost universally spread *Scrophulariaceae* are present only in the cosmopolitan *Herpestis Monnieria*.

The presence of *Loranthus* and *Viscum* in Aldabra, as well as of the Orchids, *Acampe* and *Angraecum*, is specially interesting because these elements are apparently wanting in all the other islands, except Agalega, of the Seychelles area, outside of the Seychelles Archipelago proper. *Disperis tripetaloides*, a terrestrial orchid, is recorded by Baker from Agalega. *Disperis* is mainly South African with a few Mascarene and Indian species. Orchids, it may be mentioned in passing, are exceedingly rare in remote islands of small and moderate dimensions, or entirely absent. Thus there is none in the islands of the South Indian Ocean from St. Paul and Amsterdam and Kergulen to the Crozets and Heard Island. There is none in the south Atlantic Islands from Ascension to Tristan da Cunha and South Georgia, save four species in the Falklands. Turning to the North Pacific, the Sandwich Islands possess only 3 species of Orchids; Guadaloupe Island, off the coast of Lower California, none; Galapagos, 2 or 3; Juan Fernandez. none. On the other hand, the islands to the south of New Zealand include orchids in decreasing numbers southward; the Auckland group sheltering about a dozen species; the Campbell half-a-dozen, and the southernmost Macquarie Island none at all. Absence from the last-named island is not due to unfavourable climatic conditions. About a dozen species of Orchids inhabit Seychelles and they are numerous in the Mascarenes. On the other hand, the distant Laccadives, Maldives and the Chagos Archipelago are also destitute of this family.

The large, almost cosmopolitan family of *Rubiaceae* consti-

tutes the predominating element in the woody vegetation of Aldabra both as to number and diversity of genera and number of species; but probably they are not so conspicuous, even collectively, in the scenery as the Mangroves, the Figs and *Euphorbia Abbottii*.

The conspicuous coco-nut plantations are purposely left out of consideration. There are 15 species of Aldabra *Rubiaceae*, belonging to 10 genera, of which 5 range beyond the African region, and 1, the large genus *Psychotria*, is common to the tropics of both hemispheres. *Polysphaeria*, *Triainolepis*, *Rutidea*, *Tarenna* and *Tricalysia* are limited to the African region, including Madagascar and the Mascarenes.

A list of certainly introduced plants collected in Aldabra is given in a preceding section. It is not offered as exhaustive and calls for no special remark except that there is no evidence of any of these plants being common or over-running the island.

Particulars are given in a condensed form of the Flora of the islands of Assumption, Cosmoledo, Astove, Farquhar, Providence, St. Pierre, Gloriosa, Amirantes, Coëtivy, Agalega, Cargados Carajos, the Laccadives, Maldives and the Chagos Archipelago; affording data for some interesting comparisons.

The list of plants occurring in these islands (excluding Cargados, the Laccadives, Maldives and Chagos) and hitherto not found in Aldabra is perhaps the most interesting feature. It consists of 23 species, of which about half are widely spread littoral and insular plants, accidentally absent from Aldabra, or used up by the settlers for fuel or building purposes; for example, *Afzelia bijuga*, *Terminalia Catappa*, *Barringtonia speciosa*, *Ochrosia borbonica* and *Hernandia peltata*. In a different category belong *Hisbiscus Hornei*, *Oxalis* sp. *Hippocratea* sp., *Brexia*, *Nesogenes prostrata* and *Disperis*; but they are all plants of the region outside of these islands.

In conclusion, the data collected point clearly to a common origin of the Flora of Aldabra and the neighbouring islands; and that flora is essentially African, and almost without any infusion of an Asiatic element, or, to be more precise, Malayan element. By Malayan element I mean the presence of representative species of such genera as *Nepenthes* and *Amaracarpus* (*Rubiaceae*), which have their greatest concentration in Malaya. Such an element exists in the Flora of Seychelles and in the Mascarene Flora; but it is difficult, indeed impossible, to estimate the relative importance of the various elements of a flora in attempting its history. It is easy to compile lists of plants and show their present distribution; but how and in what direction this distribution has been effected is beyond the wisdom of man to fix from available data. It is easy to generalise and theorise, and it is easy to speculate on the course of evolution and the sequence of changes in vegetation; but a satisfactory history of events is perhaps unattainable. Indeed, the more I learn of the present distribution of plants the more I am puzzled as to how it has been brought about. Of course, there is no disputing the fact that much has been accomplished and placed beyond doubt, but much more remains to be discovered before we can arrive at satisfactory results. Taking the Flora of

Aldabra for example, present conditions seem to favour, in part, that it is a remnant of a former more extensive flora, but on the other hand the presence of the component elements might be accounted for through the action of various agencies. I have elsewhere* expressed the opinion that the assumed endemic plants of Aldabra may be proved to exist in Madagascar or elsewhere. This aspect of the subject might be pursued almost indefinitely, but I prefer leaving the facts to the interpretation of more skilled minds.

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V.—THE RAIN TREE OF HIERRO, CANARY ISLANDS.

(*Oreodaphne foetens.*)

J. Hutchinson.

The island of Hierro, the most western of the Canaries, was of considerable interest to the early voyagers, on account of the supposed existence of a wonderful tree called *Garoe* or *Til*, accredited with the miraculous power of supplying the whole of the inhabitants with sufficient water for their maintenance. The water supply of dry volcanic superstructures like the Canary Islands, being of such vital importance to the inhabitants, it is natural that any phenomenon, besides rain, which provided the islanders with additional water, was regarded as the gift of Providence and venerated and worshipped accordingly. So it was in regard to this celebrated tree, as will be evident from what follows.

Whilst it is probable that the Canary Archipelago was known

to the earliest voyagers, the Phoenicians and the Carthaginians, many hundreds of years before the Christian era, we know for certain that it was visited by Roman navigators during the reign of Juba II, King of Mauritania (about 25 B.C.). The Romans regarded the islands as being the western boundary of the world. Pliny gives us Juba's† account of them, of which the following is a free translation: "Juba learned much about the Fortunate Islands [=Canary Islands] by diligent enquiry; they lie . . . . 625 miles from the Purpurariae [=Madeira, etc.], and to arrive there one must sail 250 miles west and then for 75 miles more bend one's course eastward. The first island is called *Ombrios*, where there are no signs of habitations; *among the mountains there is a pool, with trees resembling the Ferula plant, from which water is obtained; from the black trees the water is bitter, from the whiter ones sweet to the taste.* A second island is called *Junonia*, where there is a little house built of stone. Near to the latter there is a smaller island of the same name. And next in order there is an island called *Capraria*, which is full of large lizards. Within view of these islands is *Nivaria*, so named from its perpetual covering of snow and clouds. The next island is called *Canaria*, from its huge and numerous dogs, two of which King Juba brought away with him; here there are remains of dwellings. Moreover, in all these islands there is an abundance of fruit trees and birds of all kinds, as well as date-palms and pine-kernels. There is also plenty of honey, besides Papyrus and fresh-water fishes."

According to Hardouin‡ the larger *Junonia* was the island of *Gomera*, the smaller one near it a more or less submerged rock; *Capraria* was Palma; *Nivaria* the island of Tenerife; *Canaria* the Grand Canary of to-day, and *Ombrios* the island of Hierro. Another authority§, however, considered the larger *Junonia* to be Palma, the lesser one Gomera, but agreed with Hardouin as to *Ombrios* being the modern Hierro, the only one which immediately concerns us here. There are also other interpretations.

It is noteworthy that the name applied by the Romans to the last-mentioned island had some association with water supply, ομβρος being the Greek for rain. The modern Spanish name

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* See Samler Brown, Madeira, Canary Islands and Azores, ed. x. p. g. 8 (1910).

† Pliny's text is as follows, as given in the Hardouin Edition, Liber vi. Cap. 37: "Juba de Fortunatis ita inquisivit: sub meridie quoque positas esse prope occasum a Purpurariis DCXXV mille passuum sic ut CCL supra occasum navigetur deinde per LXXV mille passuum ortus petatur. Primum vocari Ombrion, nullis aedificiorum vestigiis; habere in montibus stagnum, arbores similes ferulae, ex quibus aqua exprimatur, ex nigris amara, ex candidioribus potui jucunda. Alteram insulam Junioniam appellari in ea aediculam esse, tantum lapide exstructam. Ab ea in vicino eodem nomine minorem. Deinde Caprariam lacertis grandibus refertam. In conspectu earum esse Nivariam, quae hoc nomen accepit a perpetua nive nebulosam. Proximam ei Canariam vocari a multitudine canum ingentis magnitudinis, ex quibus perducti sunt Jubae duo: apparentque ibi vestigia aedificiorum. Cum autem omnes copia pomorum et avium omnis generis abundent, hanc et palmetis caryotas ferentibus ac nuce pinea abundare. Esse copiam et mellis. Papyrum quoque et silaros in amnibus gigni."

‡ Hardouin, l.c.

§ P. Galindo and Nunez de la Penna.

Hierro, according to Webb and Berthelot*, is derived from *hero*, which signified fountain or spring in the language of the Bimbaches, the original inhabitants now long disappeared. These authors state, on the authority of Viana, that the primitive people of Hierro called the wells or cisterns, which they used for conserving rainwater, *heres*, and that this designation was still in use (*i.e.*, in 1839). This explanation of the origin of the name Hierro seems to discredit sufficiently the views taken by some writers on the Canaries that *Hierro* must mean the same as the French rendering of the word as *Fer*, which, however, has nothing to do with *fer* (iron).

In his excellent guide-book to Madeira, Canary Islands and Azores (1910), Samler Brown says of Hierro: "The coast is steep and uninviting, all the anchorages being mere open roadsteads. The cliffs rise so suddenly from the sea that there is no room for houses on the coast and consequently no seaport town to find a means of building a mole . . . . The interior is a sort of tableland along which most of the paths are conducted, and where most of the inhabitants own patches of land, on which they grow cereals, pasture their cattle, and where they live during the harvesting season . . . . The mountains, of which the Alto del Malpasa (4990 ft.) is the highest, are only partially wooded, and there is far less sylvan scenery than is to be found in the other islands of the western group, although in some places, and more particularly in the neighbourhood of El Golfo, there are a fair number of trees. There are practically no springs and the people depend for water on the rain, which is preserved in tanks. The air which passes, however, is sufficiently laden with moisture. Were the question properly studied and plantations made in judicious positions, it is probable that an increased supply could be obtained. On the arrival of the Spaniards there appears to have been a tree near Valverde called *El Garoe*, which, according to legend, distilled enough water from its leaves to supply all the people with what they required."

This tree, or perhaps more likely several trees, is supposed to have been *Oreodaphne foetens*, Nees (*Ocotea foetens*, Webb & Berthel.),† a species of laurel not now recorded from the island of Hierro. It is, however, still fairly common in the islands of Tenerife, Grand Canary and Palma, and in Madeira, where it occurs amongst other evergreens of the "laurel forest" or "Monte Verde," so characteristic of the cloud region of the Canaries. The date-palm mentioned by Pliny was no doubt the distinct endemic species *Phoenix canariensis*, Hort., considered by some authors to be a variety (var. *Jubae*) of the common date-palm, *P. dactylifera*, Linn. The pine-kernels were those of the endemic *Pinus canariensis*, C.Sm., which in former days must have occupied a much greater area of the islands than at the present time (see *Kew Bull.* 1918, 1-3).

In the narrative of Sir Richard Hawkins‡ on his voyage to

* Webb and Berthelot, Hist. Nat. Isles Canar. ii. pt. i. 151.

† See Buch, Allgem. Ubers. der Fl. Canar. Insl. 341.

‡ See Haklutus Posthumus or Purchas His Pilgrimes, vol. xvii. 64.

the South Sea (1593) we get the following account of Hierro: "Two things are famous in these islands, the Pike (Peak) of Tenerife . . . . The other is a tree in the Island of Fierro, which some write and affirme, with the dropping of his leaves, to give water for the sustenance of the whole Iland, which I have not seene, although I have beene on shore on the Iland: but those which have seene it, have recounted this mysterie differently to that which is written, in this manner; That this Tree is placed in the bottome of a Valley ever flourishing with broad leaves, and that round about it are a multitude of goodly high Pines, which over-top it, and as it seemeth, were planted by the Divine providence, to preserve it from Sunne and winde. Out of this Valley ordinarily rise every day, great vapours and exhalations, which by reason that the Sunne is hindered to worke his operation, with the height of the Mountaine towards the South-east, convert themselves into moisture, and so bedew all the trees of the Valley, and from those which over-top this Tree, drops downe the dew upon his leaves, and so from his leaves into a round Well of stone, which the Naturals of the Land have made to receive the water; of which the people and cattell have great reliefe: but sometimes it raineth and then the Inhabitants doe reserve water for many dayes to come in their Cisternes and Tynaxes, which is that they drinke of, and wherewith they principally sustaine themselves."

To this account there is a footnote as follows: "Of a tree in Fierro: One M. Lewis Jackson, now dwelling in Holborne, told me that A. 1618 he had beene in this Iland, and seene this Tree, which he thus described; It is as big as an Oake of middle size, the barke white like Hardbeame; sixe or seven yards high, with ragged boughs; the leafe like that of the Bay, white on the bottome and greene on the other side. It beareth neither fruit nor flower. It is situate in the declivitie of a Hill; in the day it is withered, dropping in the night (a cloude hanging thereon) yeelding water sufficient for the whole Iland; which containeth 8000* soules, and above 100,000* beasts, camels, mules, Goates, &c. It falls into a Pond made of bricke, floored with stones very thight, by pipes of Lead conveyed from the Tree to it, and thence divided into several Ponds through all the Iland. They which dwell up-hill fetch it in barrels. They water therewith also their corne-grounds. The Pond holds 20,000* tuns, and is filled in a night. He added a report (perhaps devised to keepe off busie fingers, or with busie tongues to multiplie wonders) that the Moores having taken that Iland from the Christians, went to fell that Tree, but each blow recoyled on the striker."

A very good account of the Rain-tree of Hierro was found in a Spanish MS.† discovered in the Island of Palma

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* There is no doubt very great exaggeration here.

† Dr. G. V. Perez, quoting the Spanish historian Viera y Clavijo, informs us that the name of the author of this MS. was Father Abreu Galindo. We have not seen a complete copy of the published work, but only a typed extract relating to the Rain-tree from a copy of the book kindly lent to Kew some time ago by Sir Daniel Morris.

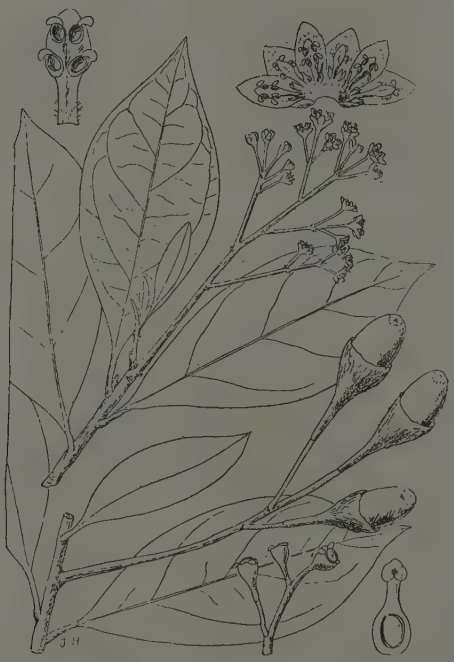
and was translated into English and published by George Glas* in 1764 (London). Its title is "The History of the Discovery and Conquest of the Canary Islands: with an enquiry into the Origin of the Ancient Inhabitants." Glas, who had himself travelled much in the Canaries, but had not visited Hierro, writes thus about the island and its water supply:—"This island produces better grass, herbs, and flowers than any of the other islands, so that bees thrive and multiply here extremely, and make excellent honey. The wine of Hierro is poor, weak, and bad, insomuch that the natives are obliged to distil the greatest part of it into brandy. There are only three fountains of water in the whole island, one of them is called *Acof*, which, in the language of the ancient inhabitants, signifies river; a name, however, which does not seem to to have been given to it on account of its yielding much water, for in that respect it hardly deserves the name of a fountain. More to the northward is another, called *Hapio*; and in the middle of the island is a spring, yielding a stream about the thickness of a man's finger. This last was discovered in the year 1565, and is called the Fountain of Anton Hernandez. On account of the scarcity of water, the sheep, goats, and swine here do not drink in the summer, but are taught to dig up the roots of fern, and chew them to quench their thirst. The great cattle are watered at those fountains, and at a place where water distils from the leaves of a tree. Many writers have made mention of this famous tree; some in such a manner as to make it appear miraculous; others again deny the existence of any such tree, among whom is Father Feyjoo, a modern Spanish author, in his Theatro Critico. But he, and those who agree with him in this matter, are as much mistaken as they who would make it appear to be miraculous. This is the only island of all the Canaries which I have not been in; but I have sailed with natives of Hierro, who, when questioned about the existence of this tree, answered in the affirmative."

Glas then goes on to give an account of the Rain-tree from the Spanish manuscript, as follows:—"The district in which this tree stands is called Tigulahe, near to which, and in the cliff or steep rocky ascent that surrounds the whole island, is a narrow gutter or gully, which commences at the sea, and continues to the summit of the cliff, where it joins or coincides with a valley, which is terminated on the steep front of a rock. On the top of this rock grows a tree, called, in the language of the ancient inhabitants, *Garse*†, *i.e.*, Sacred or Holy Tree, which for many years has been preserved sound, entire, and fresh. Its leaves constantly distil such a quantity of water as is sufficient to furnish drink to every living creature in Hierro; Nature having provided this remedy for the drought of the island. It is situated

* George Glas (1725–1765), a native of Dundee, made several voyages to the West Coast of Africa and the Canary Islands. On some paltry excuse he was imprisoned in Tenerife in 1764 for nearly a year, and on being released took passage for England on board the English barque *Sandwich*. He was killed during a mutiny on board the ship off the coast of Ireland. (See Dict. National Biography).

† This is probably a misprint for *Garoe*.

about a league and a half from the sea. Nobody knows of what species it is, only that it is called *Til*. It is distinct from other trees, and stands by itself; the circumference of the trunk is about twelve spans, the diameter four, and in height from the ground to the top of the highest branch 40 spans; the circumference of all the branches together is one hundred and twenty* ft. The branches are thick and extended; the lowest commence



Oreodaphne foetens, Nees.

about the height of an ell from the ground. Its fruit resembles the acorn,† and tastes something like the kernel of a pine-apple,‡ but is softer and more aromatic. The leaves of this tree resemble those of the laurel, but are larger, wider, and more curved; they come forth in a perpetual succession, so that the tree always remains green. Near to it grows a thorn, which fastens on many of its branches and interweaves with them; and at a smaller distance from the *Garse* are some beech-trees,

* See the great resemblance to an acorn in the accompanying sketch of *Oreodaphne foetens*.

† Glas has a footnote here saying "Not the anana, but the fir or pine tree pear, nut, or apple [= seed]. Those of Britain have nothing in them; but the pine-apples [= pine seeds] in Spain, and some other countries, contain a kernel of an agreeable taste."

bresos,* and thorns. On the north side of the trunk are two large tanks or cisterns of rough stone, or rather one cistern divided, each half being 20 ft. square and 16 spans in depth. One of these contains water for the drinking of the inhabitants and the other that which they use for their cattle, washing, and such like purposes. Every morning near this part of the island, a cloud or mist arises from the sea, which the south and easterly winds force against the fore-mentioned steep cliff; so that the cloud, having no vent but by the gutter, gradually ascends it, and from thence advances slowly to the extremity of the valley, where it is stopped and checked by the front of the rock which terminates the valley, and then rests upon the thick leaves and wide-spreading branches of the tree, from whence it distils in drops during the remainder of the day, until it is at length exhausted, in the same manner that we see water drip from the leaves of trees after a heavy shower of rain. This distillation is not peculiar to the *Garse*, or *Til*, for the *bresos* (*Erica arborea*), which grow near it, likewise drop water; but their leaves being but few and narrow the quantity is so trifling, that though the natives save some of it, yet they make little or no account of any but what distils from the *Til*, which, together with the water of some fountains, and what is saved in the winter season, is sufficient to serve them and their flocks. This tree yields most water in those years when the Levant or easterly winds have prevailed for a continuance; for by these winds only the clouds or mists are drawn hither from the sea. A person lives on the spot near which this tree grows, who is appointed by the Council to take care of it and its water, and is allowed a house to live in, with a certain salary. He every day distributed to each family of the district seven pots or vessels full of water, besides what he gives to the principal people of the island."

Dr. G. V. Perez has interested himself in the Hierro Rain-tree, and has kindly forwarded to the Director an abridged translation of an article from a Madrid paper, "Las Canarias," for November, 1917, entitled "Los Arboles Santos de Canarias," by R. Castellanos. "Hierro had no springs, but a Holy tree called Garoe, the existence of which being so marvellous has been denied to many, but is now admitted to have actually existed. The Rev. Andres Bernaldez, in his Chronicle of the Catholic Kings, says that in the Island of Hierro there is a marvel of the world; the inhabitants drink of water sweated from the leaves of a tree; there is a tree after the manner of an *Alamoyes* (Dr. Perez suggests this may have meant an *Ulmus*) alive still, that never loses its leaves, and its fruit is alike to acorns, which are bitter as gall if eaten; they are medicinal and do no harm; the height of the tree is that of $1\frac{1}{2}$ lanza (a wariance); it has large branches, and takes two men to embrace the trunk, which sweats miraculously drops of water into a receptacle placed at a lower level, so that not a drop of water is lost. From there the inhabitants get their water to drink, there being then about eighty families which got their supplies from it; the leaves are like those of a laurel but a little larger; there is not

* *Erica arborea.*

in all the seven islands another tree of that nature, nor in the whole of Spain, nor is there living man who has seen another anywhere else; and for that reason it appears to be a mystery of God who wished to supply water in such a manner as a consolation to the people who should have been thrown into that island where there never were wells or springs."

In regard to the identity of the *Garoe* or *Til*, Dr. G. V. Perez writes to the Director: "I feel positive that the tree in question was *Oreodaphne foetens*, Nees, chiefly because of the fruit, which is so like that of the Oak, with which the first Spanish settlers were familiar, different species of Oak being common in Spain. Among the different species of *Lauraceae* peculiar to the Atlantic flora and common in our evergreen forests, the one which has largest leaves, and where water appears to me to be more abundantly condensed is the tree in question."

Dr. Perez further writes that "Viera y Clavijo, the historian of the Canary Islands, in repeating the description from Father Juan de Abreu Galindo, recognised that the *Garoe* only owed its distilatory virtues to its frondosity, to its advantageous position and to the mountain mists that formed about it daily and that there was nothing supernatural in it; and the explanation of Father Abreu Galindo, who saw it, measured it and observed the tree himself, is enough to explain everything without appealing to the miraculous."

Although the Bimbaches of Hierro were friendly to the Spanish invaders led by Jean de Bethencourt at the beginning of the 15th century, it is clear that they did not wish them to remain long on the island. This may be gathered from the following story relating to the rain-tree published by Claude Duret in his *Histoire Admirable* (1605); Chapter xv., accompanied by a picture (here reproduced at Fig. A), is devoted

Fig. A.—The Canary Rain Tree: from Duret, *Histoire Admirable* (1605).

to an account of the Hierro rain-tree, and bears the following heading: "D'un certain Arbre port-eaux, c'est a dire qui fournit

d'eaux aux habitans d'une Isle." The substance of the story is as follows:—When the Spanish conquerors appeared in Hierro the natives covered their sacred rain-tree with branches, reeds, and other things, hoping by this ruse that the invaders would not see their water supply and would leave the island on account of its scarcity. The secret was, however, divulged by one of the Bimbache maidens, who fell in love with a caballero, and showed him the tree and its tanks of water. This led to a quarrel with the Spaniards, who carried off a number of the islanders as slaves, and on the departure of her lover the young woman was condemned to death.

It is interesting to note that with all its faults the picture given by Duret shows he had a good idea of the shape of the leaves, and also some hazy conception of the relationship of "drip-tips" to condensed moisture. That the Canary Rain-tree was well known and an object of considerable interest to botanists of the early 17th century is clear from the fact that a picture of the plant formed the frontispiece of Bauhin & Cherler's Historia Plantarum Generalis (1619), a copy of which we reproduce at Fig. B. The same drawing is reproduced by Parkinson (Theatrum Botanicum, 1640), who refers to Jackson's account mentioned above.

According to Dr. Perez, quoting Bartolomé Garcia del Castillo's book "Noticias del Hierro," this wonderful tree was blown down in a storm on the 12th June, 1612. He adds that in 1753 an enquiry about the tree was made in Hierro, and testimony was received from witnesses 80 to 95 years of age, who were all agreed about the tree having existed and they pointed out without hesitation where it grew, showing the remains of the tanks at its foot.

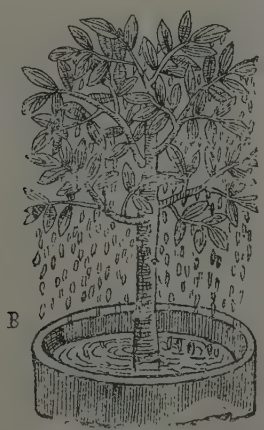


Fig. B.—Frontispiece of Bauhin & Cherler, *Historia Plantarum Generalis* (1619).

The serious effect on the climate following the destruction of mountain forests on the islands of St. Helena and Jamaica

has been well shown by Sir Daniel Morris.* In his lecture† before the Society of Agriculture and Commerce at Kingston, Jamaica, he quoted some correspondence from South Africa mentioned in J. C. Brown's Forests and Moisture (1877), p. 148, which we give in its entirety: "This season has been unusually hot and dry along the coast, and all around Graham's Town we have been unable to grow anything all this summer for want of rain. The springs are all failing. You may, perhaps, know the place of Mr. J. J. Stone, on the top of the hill on the Cowie Road, toward the sea, marked by a quantity of gum trees, on the ridge of the high hills to the south-east of Graham's Town. Well, all through the summer we had only light, misty rain, just enough to dampen the grass and not enough to wet the ground; but these trees of Mr. Stone's have there converted the mist into rain. They have scarcely felt any effects of dry weather; the vegetables and flowers have there grown all the summer without watering; there the tanks have always been full; and that is the only place of which I have heard, that it has been so within five and twenty miles of Graham's Town."

In November, 1901. Dr. Marloth,‡ of Cape Town, conducted some experiments for ascertaining the amount of moisture deposited from the south-east clouds, which appear around Table Mountain during the dry and practically rainless summer months, forming the well-known "Table-cloth." His results were little short of sensational and "excited considerable astonishment and wonder."§ Dr. Marloth placed two rain gauges on the top of Table Mountain about midway between the east and west ends of the upper plateau. One gauge was left open in the usual way, the other "surmounted with a framework representing a bunch of reeds."‖ The first experiments not proving satisfactory, owing to a combination of circumstances, Dr. Marloth continued with the experiment on December 21, 1902. "The first reading of the season was made on January 1, 1903, when it was found that the open gauge contained nothing, whilst the other one showed 15·22 in. of moisture, and that for a period of 10 days. The next reading took place on the 11th of January. The open gauge was again dry, the other one showing 14·64 in. In 21 days the reeds had condensed moisture corresponding to 29·86 in. of rain, while the open gauge showed nothing. . . . . The observations came to an untimely end on the 15th of February, because a week afterwards the gauges were found to be destroyed. . . . . The result is that . . . . . in 56 days, the gauge with the reeds had condensed a quantity of moisture equivalent to 74·87 in. of rain, and that quantity was recorded although the last three times the gauge had overflown.

"If one considers that the average annual rainfall at Cape

* A Report upon the Present Position and Prospects of the Agricultural Resources of the Island of St. Helena (Colonial Office, Jan. 1884).

† Lecture on the Occurrence of Droughts, Kingston, Jamaica, July, 1885.

‡ Marloth in Trans. S. Afr. Phil. Soc. xiv. 403–408 (1903).

§ C. M. Stewart, l.c. 413.

‖ *Restionaceae.*

Town (Town House) is 23·84 in., at the Royal Observatory 27·95, and at Newlands (Bishop's Court) 55·54, which is almost the highest record for any low-level station in the Cape Colony, the extraordinary nature of these results is obvious, and it is not surprising that the vegetation of our mountains is so different from that of the hills."

Dr. Marloth's experiments showed that the summer of the plants growing within the area of the cloud belt was not dry, but that their environment approximated more nearly to that of a swamp, a permanent swamp in winter, due to rainfall, a periodical swamp in summer, due to clouds; further, that these conditions explained the presence of "a luxuriant and thickly set vegetation on the upper parts of these mountains; why shrubs, 6 to 8 ft. high, crown the summit of Devil's Peak; why thickets of beautiful heaths, 4 to 5 ft. high, grow on the top of Jonkershoek peaks; why there is a little forest of yellow wood, *Kiggelaria*, *Olinia*, and other trees on the top of Klapmuts Hill; why the cedar grows only at a certain level on the Cedarbergen, why Proteas and heaths abound on the Zwartebergen, and why there are little lakes, even late in summer, on the top of Table Mountain as well as close to the summit of Dutoit's Peak."

Objections to Dr. Marloth's rough-and-ready methods of investigation were at once raised by Mr. Charles Stewart,* which were, perhaps, justified from a meteorological standpoint; but as Sr. Marloth stated in his reply,† after two years' further experiments, he did not look upon the figures as being equivalent to records of rainfall, for during rain a great deal of water runs off the bare rocks and reaches the streams immediately, whilst water condensed from the clouds is captured only where sufficient vegetation exists, which, on the other hand, retains a large proportion of it in the spongy root system. He stated further that there could be no question that the vegetation of the South African mountains was a very important factor in the regulation of the water supply of the springs and streams, and that this influence was exerted in two ways, firstly, by capturing a not inconsiderable amount of moisture from the south-east clouds, which would escape if the mountains were formed by bare rocks only; and secondly, by protecting the water which has accumulated in the soil and the rocks against the sun and consequent evaporation.

There seems to be no doubt, then, that vegetation plays a very important part in the collection and retention of moisture under certain conditions, and the laurel forest of the Canaries probably performs this function in just such a manner as do the trees in the South African mountains. I have quoted Dr. Marloth at considerable length, because, as he says, his earlier experiments were apparently the first of their kind for determining the influence of mountain vegetation on the collection and retention of moisture from passing clouds; and further, to bring to the notice of the inhabitants of the Canary Islands how vital it may be for them not only to preserve, but, if possible, to augment

* S. Afr. Phil. Trans. l.c.

† l.c. xvi. 103.

the area of evergreen vegetation within the region of the periodical cloud belt. For instance, experiments might be made with the various species of trees and shrubs already growing there in order to prove which were the most efficacious in the condensation of moisture from the clouds. It would seem very probable that judicious planting of such vegetation at suitable altitudes might so increase the amount of water supply, as to make possible a great extension of the area of cultivation of the banana, for which the soil of the Canaries is so suitable, and for various other crops for which the water supply at present is insufficient.

Kew is indebted to Dr. G. V. Perez, of Santa Ursula, Tenerife, for notes on the Rain-tree in correspondence with the Director, and the writer tenders his thanks to his colleague, Mr. S. A. Skan, for indicating some of the literature.

VI.—MISCELLANEOUS NOTES.

Mr. Frederick Flippance, formerly a member of the gardening staff, and for some time a Temporary Assistant in the Herbarium, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Assistant Curator of the Botanic Gardens, Singapore.

Arthur Eckley Lechmere.—The news of the untimely death of Dr. A. E. Lechmere on February 14th, following so soon after his return to this country from Ruhleben, where he was interned for over four years, has been received with the deepest regret by those who shared with him the hardships of the life in the internment camp at Ruhleben and by all who were associated with him during his studies in this country and in France before war broke out. By his death biological science loses one of the most promising and enthusiastic of the younger generation of workers at the very threshold of his career.

Arthur Eckley Lechmere was a member of the family of that name long associated with Fownhope, Herefordshire, and was born 34 years ago. Following the death of his parents during his boyhood he ultimately settled in Bristol, started training as an electrical engineer and entered the University College there in 1905, as a student in the Faculty of Engineering. He soon transferred his attention to natural science and quickly developed that passion for biology which determined the subsequent course of his life and which in the end spurred him to those achievements in the internment camp which have excited the admiration and wonder of all who have been privileged to have been brought into touch with them. Under the stimulating influence of Professor J. H. Priestley, who at that period was in charge of the Botanical Department at University College, Bristol, Lechmere adopted botany as his chief subject and sought the earliest opportunity of engaging in research in that subject. In 1909 he recived the London B.Sc. Honours degree in Botany

and the following year secured the Bristol B.Sc. degree for research in the same science. From that period his studies and inclinations lay chiefly in the direction of mycology.

For some time previously his preference for this branch of botanical science had been fostered by close connection with work on various micro-organisms in progress at the National Fruit and Cider Institute, Long Ashton, near Bristol. The association of that institution with Bristol University was then under consideration, and shortly afterwards it was attached to the University to serve as the Agricultural and Horticultural Research Station for the West of England. Financed by the Board of Agriculture and Fisheries with the aid of grants from the Development Fund, the station was immediately considerably extended and its scope of work widened to include the subject of the treatment of plant diseases. Lechmere therefore resolved to concentrate on the study of plant pathology and proceeded to qualify for an appointment on the staff there as mycologist.

With that object he went to France after taking his Bristol degree, entered the University of Paris and studied mycology under Professor Mangin at the Cryptogamic and General Pathology Laboratory of the Pasteur Institute. Before the end of his first year in Paris an opportunity of widening his training in preparation for his life-work was afforded by the grant of a Research Scholarship by the Board of Agriculture and Fisheries for a period of three years. It was characteristic of his high ideals as to the thoroughness of preparation needed for scientific investigation that he chose to continue his pursuit of knowledge in the capacity of a student for the three following years rather than accept the post which was already open to him. The first year of his scholarship was spent in Paris to complete the course which he had originally mapped out for himself and at its conclusion he was awarded the degree of Doctor of Science of that University. The remaining period of his scholarship was passed, first in London at the Imperial College of Science, and subsequently at Munich in Professor von Tubeuf's laboratory.

His appointment as mycologist at the Long Ashton Research Station was dated to start on September, 1914, and it was his intention to leave Germany the previous month. The threatening nature of European affairs caused him to hasten his departure; but events moved too rapidly and he failed to reach the German frontier at Lake Constance until twenty-four hours after the last British civilians were permitted to leave. He was for a short time detained in the neighbourhood then thrown into prison temporarily and subsequently transferred to the salt mines in Bavaria, where he was incarcerated until November of the first year of hostilities. There he suffered the severest hardships, accentuated by serious illness, and there is little doubt that this portion of his internment was largely responsible for the undermining of a constitution which was never of the best. From the salt mines he was sent to Ruhleben. In spite of the rigour of the conditions in the race-course camp, especially in the early days, the change was a welcome one

and led him to the accomplishment of what must be regarded as the great work of his all-too-brief life, which earned for him the love and devotion of all his fellows there.

The story of the stern years at Ruhleben may be more fitly left to be told by those who were his companions during that time. One need only note here, that, notwithstanding the appalling trials and surroundings, and handicapped by more or less continuous ill-health, he succeeded, as he always did, in extracting the most and the best out of life and at the end was able to look back upon it as the finest portion of his career and, in his own words, as by far the shortest four years which he had ever spent.

He was able to return to England early last December and after a brief holiday started work at Long Ashton at the beginning of February. Within a week he contracted a severe chill. Pneumonia supervening, he succumbed after a few days' illness.

His death causes a gap in the ranks of the young biologists of this country at a time when men of his calibre are most needed. It is given to few men of his years to attain the same degree of proficiency in his special subject and with it to possess the impelling personality which marked him out for a foremost place in whatever field of action he chose to select. Ruhleben provided him with his opportunity and revealed him as a leader among men. Ruhleben also has shown the measure of the loss science has sustained.

In his brief career, almost entirely spent in preparatory work, the volume of achievement in the way of original investigations was necessarily small; but he was able, nevertheless, to publish a short series of mycological papers embodying the results of his work in Bristol and Paris, which indicate his aptitude for research and his wide range of knowledge. At Bristol he was largely occupied with a study of the methods of reproduction in the *Saprolegniaceae*, an account of which appeared in the "New Phytologist" in 1911. Simultaneously he collaborated with Professor Priestley in an investigation on a bacterial disease of swedes, the results of which were published in the "Journal of Agricultural Science" in 1910. In Paris he undertook the examination of certain fungi obtained from the Côte d'Ivoire, by Chevalier, and published descriptions of two forms, *Pionnotes viridis* and *Peristomium desmosporum*, nov. spec., in the "Comptes Rendus" in 1912 and the "Bulletin de la Société mycologique de France" in 1913. His main achievement for science, however, was the development of the school of biology and the equipment of laboratories amid the almost insuperable difficulties of the camp at Ruhleben. The extent of the service which he rendered there can only be fully appreciated by those who worked with him during those four full years; but by them his enthusiasm for science and stimulating influence will never be forgotten and through them the value of his work will be passed on.

To those of us who were privileged to have been associated with him in his scientific work there remains a sense of loss greater even from the personal than the scientific point of view.

His winning personality and idealistic temperament, his vitality, boundless nervous energy and infinite kindness, never permitting him to spare himself when he could help others, his boyish simplicity, and his lofty sense of loyalty and morality made him a colleague who inspired the warmest degree of affection and have secured for him a permanent place in the hearts of all with whom he came into close contact. B. T. P. BARKER.

Mr. Guy Neville, formerly a young gardener at Kew, who was interned at Ruhleben, has furnished us with the following account of the work done by Dr. Lechmere at the camp:—

Dr. Lechmere had a cheerful and happy disposition that endeared him to all, but only those who knew him intimately could appreciate at its true worth his utterly unselfish, chivalrous, and upright nature; he was a true and thorough gentleman in the very best sense of the term, one whom it was a privilege and pleasure to know and whose loss will leave a feeling of personal bereavement in the hearts of his friends.

At the outbreak of war Dr. Lechmere was in Munich studying various methods in Cytology prior to taking up his appointment as Mycologist at Long Ashton Research Station, and was sent to Ruhleben on the 6th November, 1914.

Life in the camp in the autumn and winter of 1914-15 was very severe and depressing, the food consisting chiefly of black bread and soup, while the sleeping accommodation was very bad and insufficient, but despite all privations, Dr. Lechmere kept cheerful, and, seizing the first opportunity, started in the summer of 1915 a series of lectures in Invertebrate Zoology which, with various intermissions, continued until the break-up of the camp in November, 1918.

These first lectures, on the *Hydrozoa*, were held in the open grand stand and speedily attracted a small but devoted band of enthusiasts. The lectures were, however, discontinued owing to cold weather, but restarted in the spring of 1916, when a barrack loft was equipped (?) as a camp school, and two rooms reserved for a Biology Department, one serving as a lecture room, the other as a laboratory for practical botany. A year later these were increased by the addition of a microtomy room and a room which served to house our scientific books. Here a small number of budding zoologists with Dr. Lechmere as their doyen worked together for three years in the most perfect harmony and co-operation.

Dr. Lechmere in these three years lectured continuously, chiefly on the Invertebrata, in which he was very interested. Every phylum, with the exception of the Insecta, was dealt with very exhaustively and thoroughly, and as he was an excellent and interesting lecturer they were always attended with great pleasure. He started a series of lectures in Medical Zoology for aspiring medical and zoological students, lecturing successively on the *Protozoa*, the *Hydrozoa*, *Coelenterata*, *Protochordata*, *Scyllium*, and other types required in the usual medical course. Weekly lectures in Embryology formed a part of this

remarkable curriculum which, I believe, is unique in the annals of prisoners of war.

Popular lectures held in the theatre on such subjects as venereal diseases, evolution, microbes, monkeys, etc., made him well known to the camp, for great numbers flocked to see his marvellously arranged shadow pictures, the monkeys especially causing general astonishment and wonderment. He spent the major part of his time working in the laboratory where, being an excellent electrician, he superintended the electrical arrangements such as seed testing apparatus, incubators, imbedding bath for microtomy, electric control clock, etc. A transformer to reduce the 220 volt circuit to 4 volts for microscopic illumination he made out of old wire and flex.

These activities are related to show how he occupied his time, but only those working with him under such surroundings can adequately appreciate his constant all-pervading help and companionship which made our life livable in the dull monotony and routine of camp life and which earned our permanent gratitude. This utter unselfishness was the most inviting side of his character, for he completely forgot himself in his desire to aid, materially and morally, anyone who appealed to him for advice or assistance, though this trait was not allied to any weak sentimentality, but the spontaneous expression of a most tender and generous disposition.

Dr. Lechmere had numerous friends in other camp activities, for he, at one time, actively assisted the theatre in designing and making dresses, and was often called upon for advice, for he had a very artistic temperament.

The 23rd November, 1918, saw the first happy batch of prisoners leave Ruhleben for England, Dr. Lechmere accompanying them in the service of the Red Cross, for he assisted to transport several stretcher patients. These safely landed in England left him at liberty to enjoy a much needed holiday.

The next time I saw him was at Long Ashton, where he was establishing a home for himself; little did we think that in such a short time he would be no more. Science has lost a gifted and valuable servant. His friends have lost much more—a very brave and valiant heart. G. N.

Ranunculus nissanus.—In the note on this species in *K.B.*, 1918, pp. 374-5, the following typographical errors occur:—on p. 374, line 37, *nyssanus*! should read *myssanus*!; on p. 375, line 4, for par. read pars.; line 23, for longiusculum read longiusculam.

Schefflera siamensis.—In the description of this plant in *K.B.*, 1918, p. 363, the type is cited as *Kerr* 2281. This should read *Kerr* 2881.

FIG. 1.

FIG. 2.

I.

To face page 169.]